THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CX. No. 2448.] LONDON, APRIL 12, 1910. [62ND YEAR. PRICE 6d.

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OXIDE PAINTS, OILS, AND GENERAL STORES, FOR GAS AND WATER WORKS.
GOODMAN SAFETY GAS-MAIN STOPPERS, for Shutting off Gas in Mains temporarily during Alterations and Repairs.
GAS-LEAK INDICATORS, Short's Improved and Ansell Clock Form. *With all Latest Improvements.*
For GROUND USE, FLUSH BOXES, &c. For PURIFIER BLOW-OFF VALVES.

Patent "FLUXITE" FIRE CEMENT For Stopping Cracks in Gas Retorts.
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LUX'S Gas Purifying Material
Is now used in many Gas-Works throughout Scotland with gratifying success.
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Wet and Dry Gas Meter Manufacturer.
PREPAYMENT METERS for Pennies, Shillings, or any other Coin.
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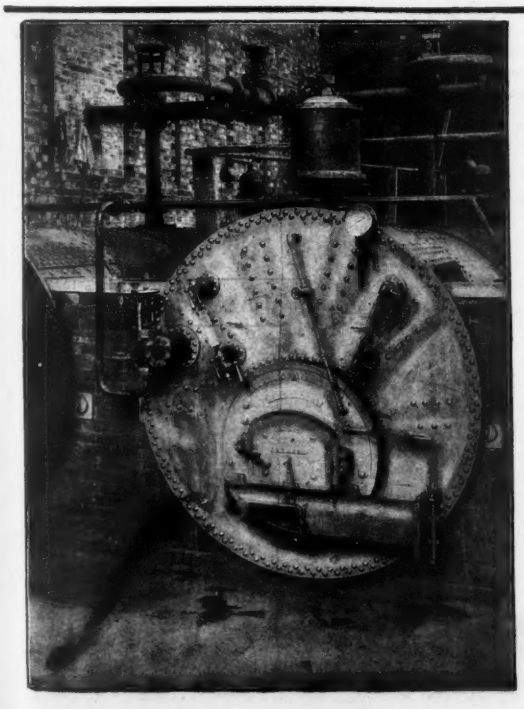

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LOW GRATE
BREEZE FURNACE.
High Efficiency.
Reduced Prices.
Recently supplied to 26 Gas-Works.
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To Gas Companies and Corporation Gas-Works.

GAS STOVE RENEWAL PLANT.

SAVE YOUR COOKERS.

Make them into **NEW ONES** with the

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No Experienced Labour Required.

After the Grease is removed, Stoves can be Cleaned and Polished *equal to New*. With a saving of at least **75** per cent. of the usual Cost.

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WATER SEAL VALVES OF ANY DESIGN.

Valves

RACK AND PINION. EXTERNAL SCREW.
DOUBLE-FACED, WITH INDICATORS.
HYDRAULIC MAIN SEAL REGULATORS.
TAR, LIQUOR AND HIGH PRESSURE, DISC,
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THREE AND FOUR-WAY FOR GASHOLDERS.
FOUR-WAY BYE-PASSES FOR ALL PURPOSES.
REVERSING VALVES for any SPECIAL APPARATUS.
CENTRE VALVES FOR PURIFIERS
in various Designs.

THE OLDEST MAKERS.

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GAS APPARATUS OF EVERY DESCRIPTION.

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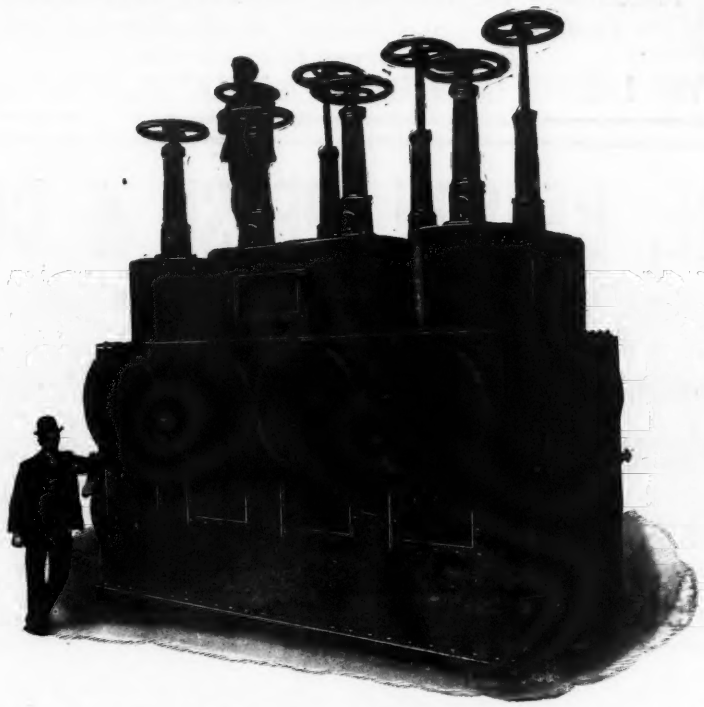

Weck's Centre-Valve for 30-inch Connections for GRANTON GAS-WORKS of the EDINBURGH and LEITH CORPORATIONS' GAS COMMISSIONERS.

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PATENT COIN PREPAYMENT GAS-METER

FITTED WITH

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ENSURES ABSOLUTE SECURITY AGAINST THEFT.

Particulars on Application.

THE LADDITE MANTLE

"the Star of the Mantle World," still **holds the field** for Strength and Light, as users have proved for themselves. The Company have recently quadrupled their powers of production to meet the great demand. **Facts speak for themselves.**

The Company are now prepared to negotiate large contracts, and guarantee prompt deliveries.

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are receiving large repeat orders for Home and Abroad for their special quality of Gas Retorts, Fire-Bricks, &c.

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Specialities:

TRANSMISSION OF POWER.

Rope & Belt Pulleys,
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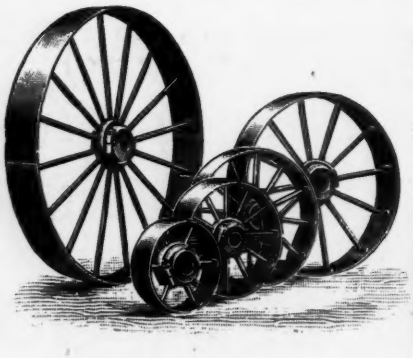

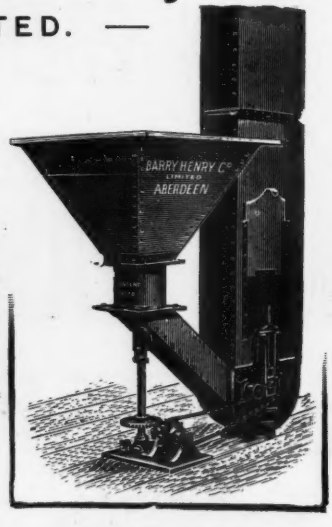

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Conveyors,
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FIRST. **"NICO"** BEST.

No. 4.
Standard "Large" Size.
75-candle power.

The **ORIGINAL** Inverted Burners and Mantles

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Complete with "NICO" Patent Gas Regulators.

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ARTISTIC
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EFFICIENCY
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THE NEW MEDIUM SIZE.

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BURNERS are used and recommended by all leading Gas Companies.

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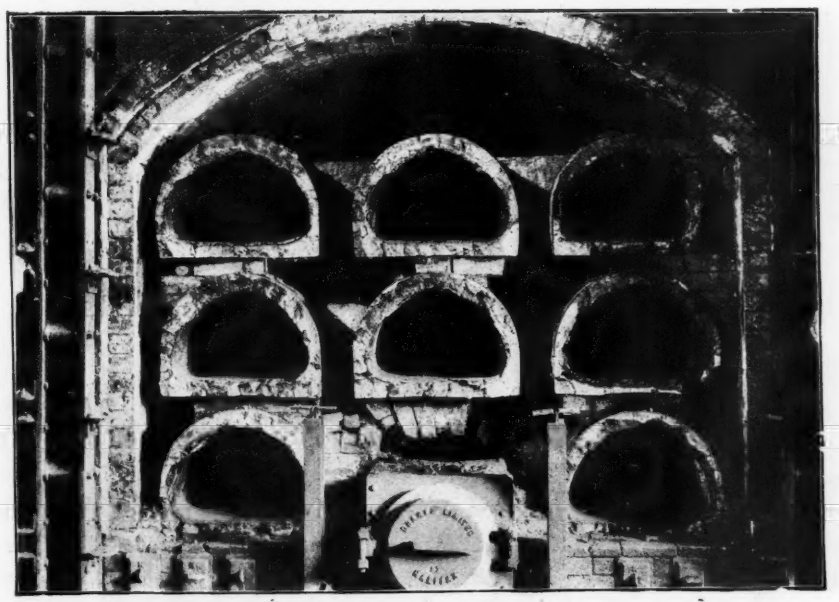
2323 DAYS' WORK.

All our Retorts are Patent Machine made.

Horizontal, Inclined, Vertical.

Special Patent Expanding Dies for making Taper Retorts at one operation.



Bricks, Tiles, and Blocks for all Types of Settings.

Specials.

Silica Bricks.

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REPORT.—"This Bed worked for **2323 days** at high heats, and is still in very fair condition. **Working results were exceptionally good.**"

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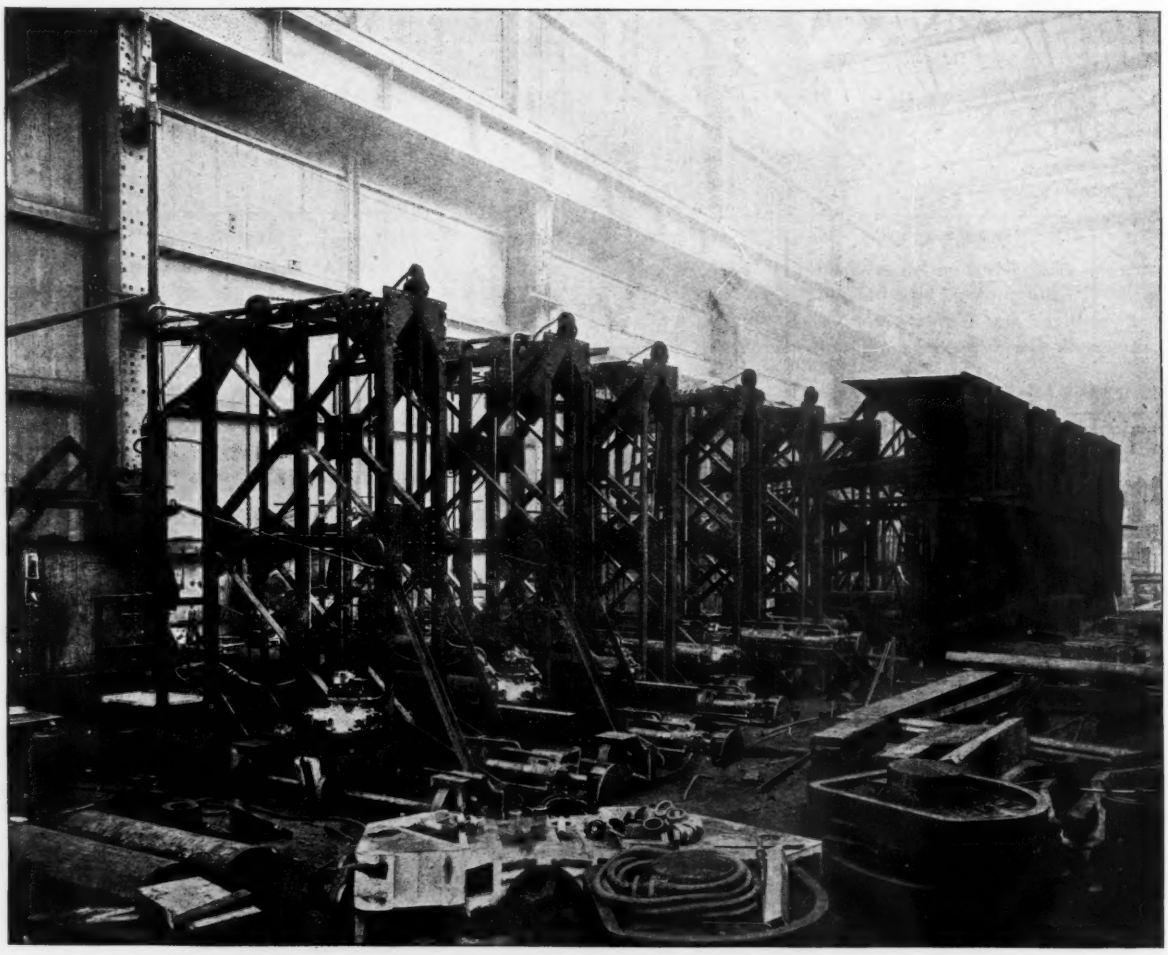
PATENT HYDRAULIC MACHINERY

FOR

CHARGING AND DRAWING GAS-RETORTS.



SIX 20 ft. THROUGH RETORT HUNTER-BARNETT PATENT COKE PUSHERS, and

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PART ORDER OF TWENTY-TWO MACHINES

For the **South Metropolitan Gas Co.,** presently in hand.

SOLE MAKERS:

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FOR FULL PARTICULARS APPLY TO THIS ADDRESS.

"WAIT AND SEE."

Mr. A——: Wait and see. (Laughter).

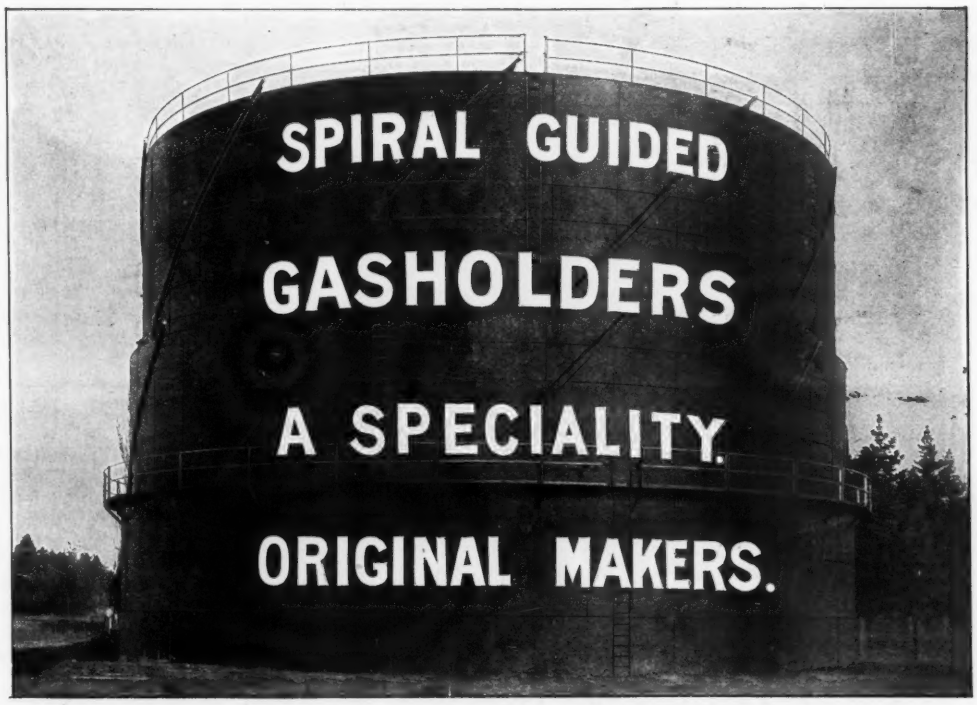
Mr. B——: It is a frigid and calculated insult to ask us to wait and see. Sir, I say with all the emphasis of which I am capable that the Lucas Inverted Lamp is here. There is no need to wait and see. It is here, and, I may add for the information of my friends opposite, that it gives no less than 1200 candle-power from a single mantle with ordinary pressure, and that there is no need of a compressor. (Loud cheers.)

Mr. C——: A terminological inexactitude. (Order, order.)

Mr. B——: Not at all; apply to Moffat's Limited, 13, Farringdon Road, London.

CLAYTON, SON & CO., LTD., HUNSLET, LEEDS.

Makers of the First Spiral Guided Holder (1889).



Two-Lift Spiral Guided Gasholder (Clayton and Pickering's Patent Guides) with Steel Tank, capacity 150,500 cubic feet, just completed for the Napier Gas Company, Limited, New Zealand, and erected at their Hastings Works, N.Z.

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WASHER-SCRUBBER.

"HURDLE" GRIDS.

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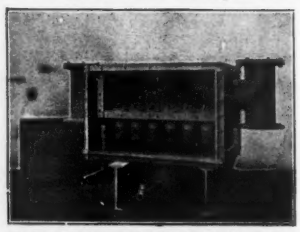

TAR & NAPHTHALENE WASHER.

Wrought-Iron TUBES And Fittings & Accessories.

LAMBERT BROS. (WALSALL), LTD.

Alpha Works, WALSALL.

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM.

BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES TOOLS, &c.

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Works Dept., 2397 Manchester.
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All Bye-Products from the Distillation of Coal dealt with.

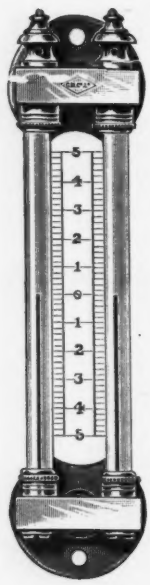
SPECIALITIES { Hydrated Oxide of Iron for Gas Purification, and of different Strengths to suit conditions of Purification, Sulphuric Acid (free from Arsenic) for Sulphate of Ammonia Manufacture, Recovered Sulphur, and Prussiates of Soda, Spent Oxide bought on Sulphur and Cyanide Contents, Tar and Gas Liquor purchased. *See our Advertisement last week.*

THE GAS METER CO., LTD.,

Manufacturers of

Wet & Dry Gas-Meters, Automatic Meters, Station Meters, Governors, Main Taps, Lamp Taps.

GAUGES, &c.



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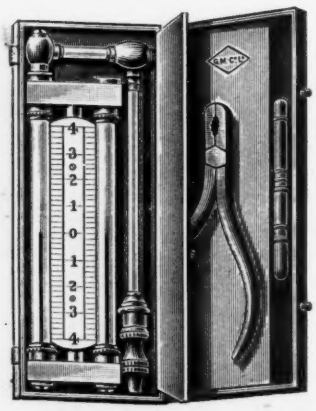

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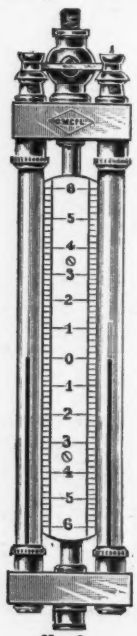

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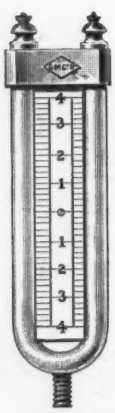

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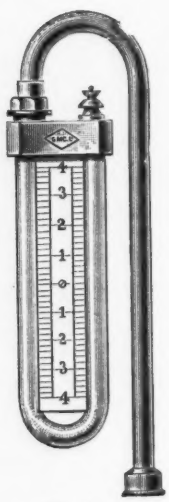

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"METER DUBLIN," "METER MANCHESTER."

Works: 238, Kingsland Road, LONDON; Union Street, OLDHAM; Hanover Street, DUBLIN; 18, Atkinson Street, Deansgate, MANCHESTER.

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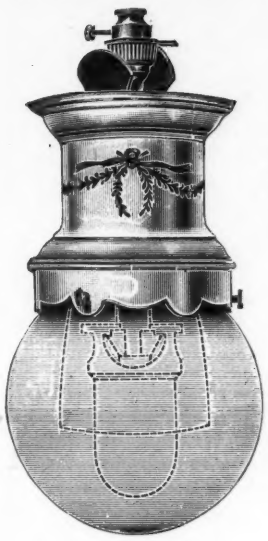
BRITISH MANUFACTURE.

110 Candles for under 4 feet of Gas per hour.

Fitted with Patent Gas Adjuster and Convenient Air Regulator; both the thumbscrew of Adjuster and lever of Air Regulator made of non-heat conducting material. Takes Graetzin Mantles and Glass, or nozzle can be supplied to take Universal fitting Mantles.



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Brass Casing in various finishes.
China Casing with Gold Lines.
Enamelled Casing with Gold Lines.
Enamelled Casing and Reflector combined.

Also made in Bijou Size for Domestic Lighting.

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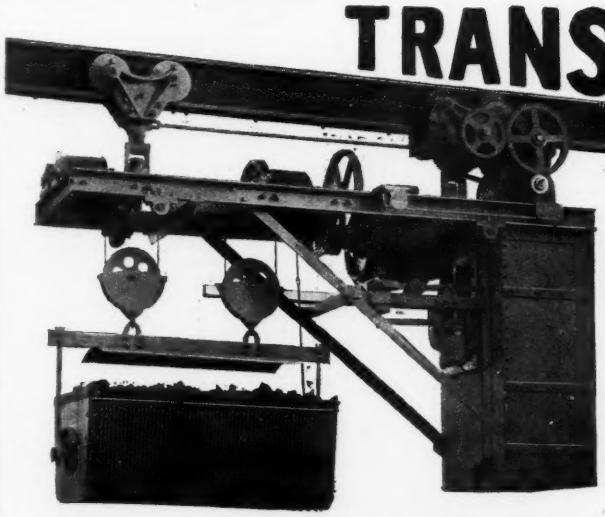

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etc., etc.

Large Installations

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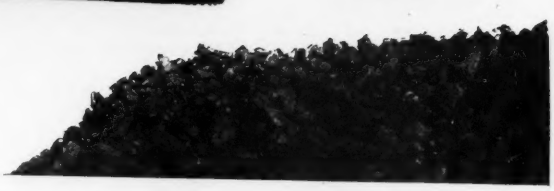
At work and on order.



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ENGINEERS, RETFORD, NOTTS.

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Agram, Croatia	200,000
Alkmaar, Holland	400,000
Allenstein, Germany	200,000
Antwerp, Belgium	1,500,000
Antwerp (2nd)	1,000,000
Ashford	250,000
Augsburg, Bavaria	425,000
Aylesbury	150,000
Barmen-Rittershausen	500,000
Barrow	300,000
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Belfast	1,700,000
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Benrath, Germany	125,000
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Berlin—Rixdorf	650,000
Berlin—Rixdorf (2nd)	700,000
Berlin—Tegel	3,500,000
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Birmingham	1,500,000
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Bochum, Westphalia	530,000
Bognor	100,000
Bordentown, N.J.	125,000
Bournemouth	1,000,000
Bournemouth (2nd)	500,000
Bremen, Germany	550,000
Bremen (2nd)	950,000
Bremen (3rd)	850,000
Brentford	1,200,000
Brentford (2nd)	850,000
Bridgwater	200,000
Bridlington	150,000
Bridlington (2nd)	200,000
Brieg, Silesia	100,000
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Bromley	1,500,000
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Brussels—Forest	1,000,000
Brussels—Koekelberg	1,000,000
Brussels—St. Gilles	1,000,000
Brussels—St. Josse	1,000,000
Brussels—St. Josse (2nd)	600,000
Brussels—St. Josse (3rd)	775,000
Brussels—Ville	750,000
Brussels—Ville (2nd)	750,000
Brussels—Ville (3rd)	1,500,000
Brussels—Ville (4th)	350,000
Bucarest, Roumania	1,100,000
Budapest, Hungary	50,000
Budapest (2nd)	1,750,000
Carlisle	600,000
Carlsruhe, Germany	500,000
Chigwell	350,000
Chorley	300,000
Commercial, London	850,000
Commercial (2nd)	850,000
Commercial (3rd)	1,250,000
Commercial (4th)	2,000,000
Copenhagen	700,000
Copenhagen (2nd)	2,500,000
Courtrai, Belgium	250,000
Coventry	600,000
Coventry (2nd)	600,000
Cracow, Galicia	200,000
Cracow (2nd)	200,000
Crefeld, Germany	500,000
Croydon	1,250,000
Croydon (2nd)	625,000
Croydon (3rd)	625,000
Croydon (4th)	550,000
Debreczin, Hungary	100,000
Deventer, Holland	150,000
Deventer (2nd)	200,000
Dorking	150,000
Dublin	2,000,000
Dublin (2nd)	2,000,000
Dublin (3rd)	650,000
Dundee	1,500,000
Dunedin, N.Z.	150,000
Dunedin, N.Z. (2nd)	275,000
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G.L. & C.Co., ,, (2nd)	2,250,000
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Gosport	200,000
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Göteborg (2nd)	600,000
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Guildford	350,000
Guildford (2nd)	200,000
Haarlem, Holland	850,000
Hamburg, Germany	1,750,000
Hampton Court	500,000
Hampton Court (2nd)	600,000
Hartlepool	750,000
Hebden Bridge	200,000
Heidelberg, Germany	200,000
Holyoke, Mass.	600,000
Hong Kong	450,000
Hull	1,500,000
Ilford	650,000
Innsbruck, Austria	200,000
Ipswich	750,000
Kampen, Holland	350,000
Kiel, Sleswig	1,000,000
Kiel (2nd)	880,000
L. & N.W. Rly., Crewe	700,000
Lausanne, Switz.	250,000
Lawrence, Mass.	400,000
Lea Bridge	350,000
Lea Bridge (2nd)	350,000
Lea Bridge (3rd)	400,000
Lea Bridge (4th)	1,000,000
Leeuwarden, Holland	400,000
Leiden, Holland	500,000
Leiden (2nd)	575,000
Leigh, Lancs.	350,000
Lemberg, Galicia	260,000
Lemberg (2nd)	500,000
Liége, Belgium	1,000,000
Liége (2nd)	750,000
Lincoln	500,000
Liverpool	3,500,000
Liverpool (2nd)	4,500,000
Liverpool (3rd)	750,000
Longton	600,000
Louvain, Belgium	800,000
Lübeck, Germany	400,000
Maastricht, Holland	200,000
Magdeburg, Germany	1,400,000
Maidenhead	225,000
Maidenhead (2nd)	225,000
Maidstone	500,000
Malines, Belgium	500,000
Malmö, Sweden	350,000
Malta	400,000
Manchester	3,500,000
Manchester (2nd)	3,500,000
Marlborough	100,000
Mayence, Germany	700,000
McKeesport, Pa.	500,000
Merthyr Tydfil	300,000
Middlesbrough	1,250,000
Namur, Belgium	175,000
Nelson	400,000
Newburgh, N.Y.	600,000
New York	5,200,000
Nictheroy, Brazil	250,000
North Middlesex	150,000
North Middlesex (2nd)	200,000
North Middlesex (3rd)	75,000
Norwich	1,000,000
Norwich (2nd)	300,000
Norwich (3rd)	500,000
Nottingham	1,000,000
Nottingham (2nd)	1,000,000
Nuneaton	125,000
Oberhausen, Germany	175,000
Oldenburg, Germany	200,000
Ostend, Belgium	100,000
Ostend (2nd)	200,000
Perth, W.A.	125,000
Poole	1,500,000
Port Elizabeth, S.A	400,000
Portsmouth	1,000,000
Posen, Germany	450,000
Posen (2nd)	700,000
Prague, Austria	140,000
Preston	1,400,000
Reading	1,000,000
Redhill	275,000
Redhill (2nd)	300,000
Reichenberg, Bohemia	200,000
Reichenberg (2nd)	200,000
Revel, Russia	350,000
Rhymney Valley	175,000
Romford	300,000
Romford (2nd)	350,000
Rotterdam, Holland	850,000
Rotterdam (2nd)	1,500,000
Rotterdam (3rd)	750,000
Rotterdam (4th)	750,000
Rotterdam (5th)	600,000
St. Albans	700,000
St. Gallen, Switz.	225,000
St. Gallen (2nd)	225,000
St. Joseph, Mo.	750,000
San Paulo, Brazil	700,000
Santiago de Cuba	400,000
Scarborough	800,000
Schwelm, Westphalia	100,000
Shanghai	225,000
Shanghai (2nd)	225,000
Shanghai (3rd)	1,600,000
Southampton	800,000
Southampton (2nd)	500,000
Southampton (3rd)	600,000
Southgate	400,000
Southport	750,000
Southport (2nd)	900,000
South Shields	650,000
Stafford	500,000
Staines	600,000
Stettin, Germany	880,000
Stockholm	1,500,000
Stockholm (2nd)	1,750,000
Stockport	600,000
Stockport (2nd)	600,000
Stockport (3rd)	400,000
Stockton-on-Tees	500,000
Swansea	750,000
Swansea (2nd)	1,000,000
Swansea (3rd)	450,000
Swindon	300,000
Sydney—Harbour	500,000
Sydney—Harbour (2nd)	500,000
Sydney—Mortlake	500,000
Sydney—Mortlake (2nd)	500,000
Syracuse, N.Y.	850,000
Taunton	225,000
Taunton (2nd)	350,000
The Hague Holland	1,000,000
The Hague (2nd)	500,000
Tilburg, Holland	400,000
Torquay	350,000
Tottenham	750,000
Tottenham (2nd)	750,000
Tottenham (3rd)	350,000
Tottenham (4th)	1,000,000
Tottenham (5th)	1,000,000
Tottenham (6th)	1,250,000
Tunbridge Wells	1,000,000
Utrecht, Holland	1,000,000
Utrecht (2nd)	1,000,000
Verviers, Belgium	1,000,000
Vienna	3,500,000
Vienna (2nd)	2,500,000
Waltham	400,000
Wandsworth & Putney	1,800,000
Watford	300,000
Watford (2nd)	350,000
Wellington, N.Z.	350,000
West Bromwich	550,000
West Ham	1,500,000
West Ham (2nd)	800,000
Weston-super-Mare	350,000
Weston (2nd)	350,000
Wexford, Ireland	100,000
Wiesbaden, Germany	850,000
Winchester	225,000
Winchester (2nd)	125,000
Wolverhampton	1,500,000
Zwolle, Holland	200,000
Zwolle (2nd)	200,000

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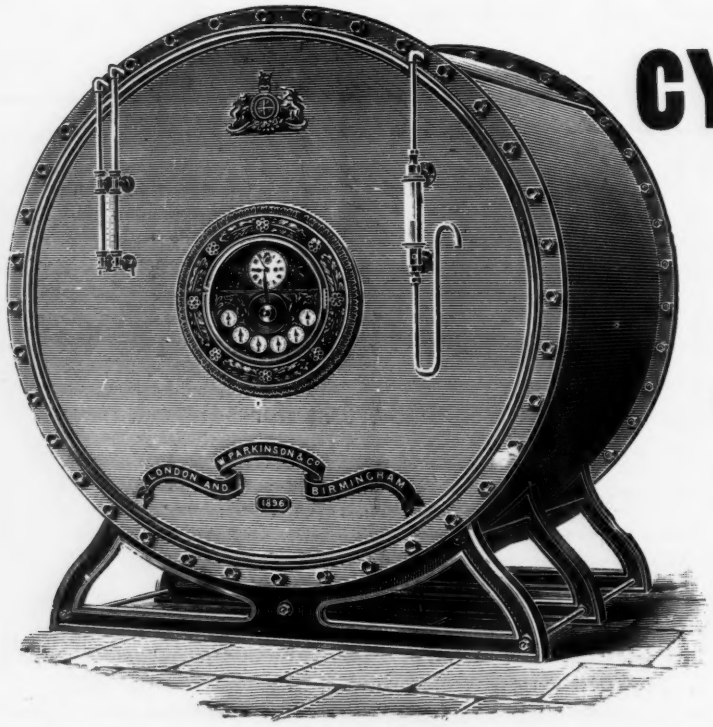

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VOL. CX., No. 2448.—TUESDAY, APRIL 12, 1910.

EDITORIAL NOTES—GAS, &c.

Standard Gas-Burner Bills—Preamble Proved.

THE great fight of the parliamentary session for the gas industry took place on Thursday and Friday last week, and was continued yesterday before Lord Ritchie and other members of the Upper House. The Bills that provoked the contest are those jointly promoted by a number of Gas Companies (under the auspices of the Gas Companies' Protection Association), for the purpose of giving them, in testing their gas, the burner that has been selected by the authorities as the most suitable one for developing the illuminating quality of gas in evaluating it whatever the standard, and so doing it justice. The tale of advantages in adopting a common standard burner applicable to all ordinary qualities of gas was again unfolded; and the fearful financial injuries that such adoption is supposed to inflict on consumers were again measured with infinite care, so much so that figures appeared on the right-hand side of the decimal point, and percentages were quoted that require much fattening to make them look at all impressively harmful. The opposition made a great mistake, and lost a fine opportunity. The burner has been sanctioned in the cases of about 80 gas undertakings in the country, supplying hundreds of thousands of consumers; but from them all (including Manchester) the opposition did not produce a single discontented consumer, a consumer who had any complaint to make, or, in short, a consumer who cares a fig about the matter. Considering the small percentage of gas now used in flat-flame burners (which it were better for consumers were not employed), all this opposition is farcical, and borders on the ridiculous. We have no sympathy at all for narrow-minded partisanship; nor have we for any insinuations as to dishonesty in deliberately doing something that is tantamount to robbing the consumers. Here we have conditions that are bound to produce their own compensations, as anyone with only fragmentary knowledge of the subject can see.

Yesterday proved itself a red-letter day for the gas industry, for just before the ordinary time for the rising of the Committee, after a very few minutes' deliberation, their Lordships found the preamble of No. 1 Bill proved. Mr. Talbot and Mr. Ram had addressed the Committee; but their speeches were ineffective performances compared with the vigorous and trenchant criticism, made with finished analytical skill, by Mr. Honoratus Lloyd. The case was clearly in his hands. He had good material to work upon in his defence of the burner, which, as a definite measuring instrument with common applicability, ought to be adopted universally, just as any other of our recognized instruments of measure. There was an attempt to get the Committee to take favourable notice of a clause suggesting that, if the Bill was passed, each promoting Company's standard of illuminating power should be raised in degree commensurate to any—slight though it be—degradation of the illuminating power caused by the adoption of the new burner. This apparently was proposed in lieu of any decapitation of the standard price. But the proposal was one that could only have found inception in the brain of the veriest ignoramus in respect of the applications of gas at the present day. The Committee absolutely ignored the proposition. The clear pronouncement of Lord Ritchie that the Committee found the preamble of the Bill proved, without any mention whatever of terms of any sort, caused some consternation among the opposition representatives; for it was recognized at once that the decision must also apply to Bills Nos. 2 and 3. There was some speculation as to whether the Committee would cut the Liverpool Gas Company out of the Bill, in view of their distinct conditions. But the Company go forward with the rest; and, in the interests of the fight for uniform gas testing, this is a matter for congratulation. We are, in fact, not at all sure that the case of Liverpool had not some influence in showing the Committee the absurdity of the existing unequal conditions in regard to gas testing in this country.

But though success has attended the Bills to this point, there are still clauses to be considered; and these will be taken to-morrow. It must not, therefore, be thought that all is finished at the moment. Calorific power and special local circumstances may be raised on clauses. But it is somewhat doubtful whether the opposition will appear to-morrow, as there was not merely whispering, but loud talk, in the corridors as to carrying the fight to the Lower House. This, however, is often the case while the heat of defeat incapacitates from making a shrewd judgment of the position. On cool reflection, and after consideration of the strength of the case for the burner, and of the examination of the character of the opposition evidence by Mr. Honoratus Lloyd, the opposition may see things in quite a different light. Before the official representatives of the promoters of the Bill left the House, there was a private conference with Counsel in one of the Committee-rooms. Nothing it is felt must be left undone to carry through these Bills. Let it be remembered that the occasion is a historical one for the gas industry. Further comment must be deferred till the next issue.

Suitable Gas, and Just Financial Treatment for Gas Undertakings.

THOUGH titled "Informal," the proceedings at the meeting of Scottish Gas Managers held on Wednesday last, under the chairmanship of Mr. D. Vass, were of a valuable kind. When there are grievances to redress, or when there is a special policy to impress, in which there is a common interest, it is well to take counsel together. But, having done so, the matter should not be allowed to be again submerged by other current topic. In the absence of Mr. Alex. Wilson, who was (as was Mr. W. R. Herring, whose contribution to the proceedings is commented upon in another article) engaged in London upon the Glasgow Gas Bill, Mr. Councillor W. B. Smith, of Glasgow, advocated the adoption of a policy of lower grade illuminating gas as a wise step in these days; and Mr. Alex. Yuill and Mr. Vass brought matters before the meeting constituting grievances from which gas undertakings generally are, in varying ways and degrees, suffering.

With all deference to Mr. Wilson, we say that Mr. Councillor Smith admirably filled his place with his paper on "Smokeless Fuels," in which he argued, from the practical standpoint, the advantage of distributing a lower grade illuminating gas than is all too commonly the vogue in Scotland. What Glasgow thinks of this matter is stated in concise form in the few-lined clause in the Corporation Bill which proposes that the standard of the illuminating power of the gas supplied in the city shall be reduced to 14 candles. There is no gainsaying the truth that a lower grade illuminating power broadens, through its economies and applicability, the field of usefulness for gas as an illuminating agent and as a fuel; and with such a gas Mr. Smith regards the prospects for good service on the part of the gas industry as being greater and brighter than ever. Scotland has been hard to move in this matter of descent from an absurd high illuminating-power gas to a lower quality in that respect; and the advocacy of an administrator (as distinct from a technical officer) may have excellent influence with the powers that be in the places where there is still a clinging to the old ways, as though the modes of utilization had stood perfectly still. The paper shows clearly that the adherence to the illuminating quality of the past is a positive obstacle to the attainment of the highest possible efficiency. There is a little lesson in the paper for the obscurants who continue an insensate fondness for a higher grade of gas than is necessary for the purposes of the day. A gas of 14-candle power or under may have been described by consumers as a "bad" gas or a "poor" gas in the days of the flat-flame burner; but it is not so described now when the atmospheric flame for all purposes will afford the best results. A truth can often be impressed by extremes. Who would have thought at one time of day that a gas of from 20 to 25 candle power would have been characterized as

"bad" or "poor"? But it has actually come to pass. There is complaint among consumers who employ incandescent burners that such gas for such burners is both "bad" and "poor." The conditions of the popular valuation of gas have thus changed; and this our friends who ardently work in placing obstacles in the road to the adoption of the new testing-burner fail to recognize. The adherents to high illuminating grade gas open their eyes in undisguised wonder at these new complaints. But there is the fact. Such gas is gross and unsuitable for incandescent burners, and for any other purpose for which it has to be mixed with air for combustion purposes. With fouled incandescent burners—fouled by the high-grade gas—which will not efficiently perform their duty, consumers still complain of the gas as "bad" and "poor." They are right. The lower grade gas, within limits, is the better; and in paving the way to further descent in regard to illuminating power, Glasgow is doing its part well in helping forward to the goal of utilization with the utmost efficiency. We agree fully with Mr. Smith that the distribution department of every gas undertaking should incorporate a scheme of inspection for gas fires and cookers. The present satisfaction of customers is an asset of no mean value in any commercial business.

Coming to the papers in which there are presented grievances that require concerted action to produce remedy. The question of an allowance for depreciation in assessing for income-tax has been a live one since the issue of the famous circular by the Income-Tax Commissioners, instructing their surveyors to single out gas and water works undertakings for special and unfavourable treatment in this regard. By reference to chapter and verse, Mr. Alex. Yuill contends that legally the Commissioners are bound to allow depreciation; and he is supported in doing so by a pronouncement of the Chancellor of the Exchequer in 1907. There is no selective power whatever conferred on the Commissioners, enabling them to favour one class of undertaking in this respect, and to put another class in a distinctly unfavourable position. From quoted Acts and pronouncement, it would appear that the Commissioners are doing something that is *ultra vires* in setting gas and water undertakings outside the pale of equality in considerate treatment. Mr. Yuill holds that the question is too momentous to be dealt with by individual undertakings, and should be taken up by the Council of the Institution of Gas Engineers. The Council have the matter under consideration; but there seem to be few of our Scotch friends who were aware of the fact. This might be taken by the Council as a hint that the annual record of their movements is hardly sufficient to keep the memory of the existence of the Council and of their labours green in the minds of the rank and file of the Institution members.

The second paper in which there is a grievance also requiring remedy is the one by Mr. Vass on the appropriation of surplus gas revenue for the relief of the rates and for other purposes. We are in total agreement with the spirit and letter of the portion of the Burghs Gas Supply (Scotland) Act under which municipal owners of gas-works are enabled by the utilization of their surpluses to reduce the price of gas to the lowest possible figure. But there is an anomaly, in that any local authority carrying on an electricity-supply undertaking as also a gas undertaking may, owing to the position in which the law stands at the present time, notwithstanding the precise words of the Burghs Gas Supply (Scotland) Act, have recourse to the gas profits for making up any deficiency on the electricity supply undertaking. There is an injustice here; and redress is desired. But it is really the gas consumers who require to be moved in this matter. They are the long-suffering victims of indirect rating; and they should certainly insist on being released from the position of contributing the wherewithal to make good the deficiencies of commercial crookedness or administrative obtuseness. Electricity supply is not in its infancy now; and the infancy argument for preferential treatment cannot be seriously put forward to-day without bringing upon it the contempt and ridicule it deserves.

Financial Considerations Affecting the Vertical Retort System.

Of the making of literature on the newer systems of coal carbonization for gas production, there appears to be no end; and there is profit to the gas industry in the fact. We want as much as possible of critical technical examination of position and problems; for through it—through various minds and from various standpoints—is the only way to arrive at truth, and at the correct relationship of considerations. The paper that Mr. W. R. Herring presented at the Informal Meeting of Scotch Gas Managers last week is an excellent example of the helpful type of contribution to the vertical retort question; but for the "informal meeting" and for the contribution itself, it was a pity that, as one of the technical supporters of the Glasgow Gas Bill, Mr. Herring, at the time of the meeting, was compulsorily at Westminster. There can never be too much acknowledgment of the work across the Border that has assisted so materially in laying the foundations for the design of vertical retort-settings for the carbonization of coal for gas production; and, Mr. Herring, in view of the position he occupies in Scotland, did well in placing the acknowledgment in the forefront of his paper. We are inclined to at once agree with Mr. Herring in his statement, but to disagree with the inference that may be incautiously drawn from it, that the factor that has permitted the use of the vertical retort for the production of illuminating gas is the changed conditions under which we are now working. The "use," yes; but the "changed conditions" in respect of gas utilization were not the incentive to the revived work in the attempt to make the vertical retort a practical success in the chief process of gas manufacture. The labour factor was really a stronger incentive. That in passing only. Mr. Herring favours continuous as opposed to intermittent vertical working, as he believes in rendering the process as automatic as possible. But this preference did not prevent him taking a general and impartial view of the subject, though in the survey, and in stating the claims of the vertical system, we do not think he made sufficient of the collateral advantages either in connection with the continuous or the intermittent methods of operation—such as reduction of naphthalene and sulphur compounds, and improved coke and tar.

Perhaps it is unnecessary to disclaim again that we are by no means partisans in this matter of the rival vertical systems. The attitude of all progressives—progressives in the technical sense—must be to let the aggregation of superiority in any one system be the determining factor in marking progress and in conferring favour. In this independent spirit, therefore, we think that the statement in Mr. Herring's paper that "on the face of it, it does not "appear that the intermittent system will offer the same "advantages under the heading of labour as the continuous "system will do" needs, in the light of present information, if it refers mainly to labour costs, a little qualification. Lower down in his paper the author says that the Dessau-Sunderland plant is stated to cost 3d. per ton of coal carbonized; and the Woodall-Duckham and the Glover-West systems are estimated to amount to the same sum. From this statement, it would appear that there is a fair range in equality in the matter of labour costs, in respect of which the new Berlin setting of eighteen retorts seems to have brought about a considerable beneficial difference compared with its immediate predecessors with fewer retorts in a setting. In the Bradford report published last week (p. 35), the labour costs in connection with this new Berlin setting were put at 2·5d. per ton, which, as a matter of fact, is the lowest figure quoted in the table.

But if there is one lesson above all others to be gathered from Mr. Herring's paper, it is that the mistake should not be made of taking labour costs alone as the factor upon which judgment must be passed as to financial superiority. Taking 3d. per ton as representing the cost of labour with the verticals, labour with the inclined system at Edinburgh costs 9d.; so that there is a saving of about 6d. This, *primâ facie*, is flattering for the vertical retorts. But then, taking the structural costs, Mr. Herring quotes £175 to £185 per ton of carbonizing capacity per twenty-four hours for verticals, as compared with £100 to £110 for inclined retorts, in both cases with complete equipment. Reckoning interest on these capital costs at 5 per cent. per annum, this would amount to 6d. per ton on the inclined system and 10½d. on the vertical system—that is to say, interest would amount to 4½d. per ton capacity more on the verticals than on the inclined system as worked at Edinburgh. This, however, still leaves to the advantage of the verticals 1½d. per ton, calculating labour and interest alone. The 1½d., however, may be further reduced when Mr. Herring can work his inclined retorts to their fullest advantage. But accepting conditions as they are, the 1½d. difference does not exhaust the financial advantages of the vertical process. Mr. Herring, for instance, sees no reason why the cost of repairs and maintenance should not be less; and in respect

of fuel consumption per ton of coal carbonized, it should, if anything, be "a little less." Some monetary credit, too, may be taken for improved coke, though perhaps this is a point of which overmuch should not be made, as being an uncertain quantity. While, further, the money effect is not readily definable, the reduced naphthalene and sulphur content of the gas is worth something—in relation to the former on account of the lessening of the treatment of the gas to deal with the naphthalene, or alternatively of the cost in respect of labour in remedying naphthalene troubles. Reverting to the question of fuel costs, the "little less" referred to by Mr. Herring is really of more importance than the term used expresses. It is, indeed, an important question as to really how much can be saved on the fuel account. Mr. E. Körting put this point in an exceedingly striking way in the article on "Modern Methods of Carbonization" published in the "JOURNAL" on Jan. 11 last. He said:

> The economy of wages by means of further improvements is scarcely worth consideration at the present day. On the other hand, the fuel consumption clearly is very important. The wages at Berlin rates amount at the present time to about 0·3d. per 1000 cubic feet, whereas the fuel consumption in heating the settings entails a cost of about 3d. per 1000 cubic feet. Hence it will be seen that a reduction of 10 per cent. in the fuel consumed amounts to as much as the whole expenditure on wages.

Though neither in gas yield nor in financial results (regarded within the limits he takes) does Mr. Herring appear to find much advantage in the vertical retort over existing types worked according to modern approbation and mode, he is himself experimenting with vertical retorts of his own design; and he recommends those who are thinking of extending their carbonizing plant not to omit consideration of verticals. Not only Edinburgh, but Glasgow is experimenting with verticals. And we shall be watching with interest Mr. Alex. Wilson's trials with his continuous-intermittent retorts, and Mr. Herring's system which is at will changeable from continuous to intermittent working, and *vice versâ*. It will be appreciated that there are coals for which, and there are times when, a reversible method of working will certainly be an advantage.

Fire Statistics.

INSTRUCTIVE as usual are the annual report and statistics of the Chief Officer of the London Fire Brigade—now Lieutenant Sampson Sladen, R.N. The most notable feature for our readers is that the fires in 1909 due to gas (for most part through negligence) are down to 332, compared with 366 in 1908. And this notwithstanding the many thousands of new consumers and gas fires, stoves, and other appliances connected up during the year by the three Metropolitan and the Suburban Gas Companies whose areas of supply come within the London Fire Brigade district. On the other hand, to electricity is attributed 103 fires, compared with 102 in 1908; and to the account of electricity falls what the Chief Officer of the brigade describes as "the "most serious outbreak of the year." That is the melancholy, devastating fire, on Dec. 20, at Messrs. Arding and Hobbs, at Clapham Junction, in which eight persons lost their lives, and which had its origin in the bursting of an electric lamp in the neighbourhood of inflammable goods in one of the shop windows. There were also 288 fires during the year the causes of which are labelled "unknown." It cannot therefore be said how many of these were due to electricity, which sets to work at generating conflagrations in such a stealthy way, and no doubt wholly in many cases covers its originating work by the completeness of its destructiveness. When gas is concerned in the origin of a fire, there is often premonition through the smell of an escape of gas; and it may be held that there are few fires in which gas has really had an initiative part that escape being placed to its account. As the Chief Officer hints, too, if people were less careless with naked lights, there would be a considerable reduction in the fires to be recorded.

Of the 332 gas-generated fires recorded in the report, no less than 115 are ascribable to curtains, blinds, clothes, and other goods coming in contact with gas-flames. These are mostly the result of carelessness. A further 100 are entered up to gas escapes, as against 108 in the previous year. To negligence is traceable a large proportion of this class of fires, as gas leakages do not usually suddenly develop themselves and get immediately fired. Quite a reverse order of things exists with electricity, which gives no warning. The foolish act of seeking for gas escapes with a light is only responsible for eleven fires on this occasion, as compared with fifteen in 1908. And these again are due to carelessness; for no one can surely in these days plead ignorance of the danger as an excuse. If the gas-generated fires due to carelessness and neglect were deducted from the total number registered against gas, the result would be that, notwithstanding the number of new consumers connected to the mains of the three London Gas Companies in excess of that coupled up to the cables of 28 electricity undertakings serving a larger district than the three Gas Companies, the number would strikingly coincide with that of the known electricity-generated fires.

From the electricity statistics of the London County Council, we get a better knowledge than from other returns of the actual number of consumers connected to the cables of the thirteen Electricity Supply Companies and fifteen Borough Councils of London—28 in all. The statistics are for the year 1908-9; and only the Charing Cross Company omit to make a return of the number of its customers. The reticence of this Company in this matter is singular. The other 27 undertakings have, in round figures, an aggregate of 104,000 consumers; and if we assume the Charing Cross Company have 11,000 (which is doubtful), that would make a total of 115,000. But taking this number, the 103 known electricity generated fires average 1 to every 1113 consumers. In their smaller area, the three London Gas Companies have now approximately 1 million consumers, the majority of whom use, additional to lighting, gas-fires, cooking-stoves, and other heating appliances. The 332 fires last year therefore average 1 in 3012 customers, as contrasted with the 1 to every 1113 electricity customers. There is every reason for satisfaction with this average for gas, more particularly as the greater number of the gas-originated fires were of very minor character, and resulted in comparatively little loss of life and property. In fact, throughout the year in densely populated London only one life was lost through an explosion of gas, and one through clothes coming in contact with a gas-stove. We are therefore in the position to claim for gas, on the evidence of authoritative statistics, that it is a safer servant than electricity as an illuminant and otherwise, and that the majority of the fires that do occur through it are due to crass negligence and stupidity. Beyond these points, the great safety factor of warning that is an attribute of gas, is entirely absent with electricity.

Gas-Meter Testing and Registration in London.

It is not, we think, an exaggeration to say that in few cases has the custom of transferring commodities from one person to another on consideration of money payment caused more trouble between the buyer and seller than in that of the supply of gas. In what may be called the ante-measurement days, consumers were not altogether satisfied; nor were they on the introduction of the meter, which has come to be regarded by many as an instrument capable of all sorts of vagaries to their detriment, and no opportunity is lost for holding it up to condemnation. The recent publication of the annual report of the Inspector of Gas-Meters for the Corporation of London (Mr. James Stratford), the principal portions of which will be found elsewhere, afforded just such an opportunity; and it was promptly seized upon by certain writers in the Press. Mr. Stratford and his staff tested 86,383 meters last year—32,728 of them being new; and 2564 new and repaired meters were rejected and sent back to the makers for correction. When they were returned correct, they were tested again free of charge. The rejection of these 2564 meters was fastened upon, though, as a matter of fact, only 656 of them were found to be registering against the consumer, while 1007 were working slow, or against the supplier. When figures taken from such a report as the one under notice are brought before the general public, it is only fair that they should be compared with the enormous number of meters that are fixed in London in the course of twelve months, all of which have to pass the tests laid down in the Sales of Gas Act. The figures just quoted show the care taken in ensuring the accuracy of the meters before they are fixed in consumers' premises; and Mr. Stratford acknowledges that the makers "appreciate such supervision of their work." No one pretends that the gas-meter is an absolutely correct instrument, nor, for the matter of that, is the one used in the supply of electricity; for a few years ago Mr. Bellamy, the Lighting Inspector of Liverpool, rejected as inaccurate no fewer than 1089

electricity meters out of a total of 2981, or 36½ per cent., while only 105 gas-meters were rejected out of 4654, or 2¼ per cent. Returning to Mr. Stratford's report, there were 7544 cases of disputed registration of meters in London last year; 2658 being correct and 3335 wrong. Of the latter, 1430 were fast and 1905 slow. These figures bear out a statement reported to have been made by Mr. H. Rayner, the Secretary of the Gaslight and Coke Company, to a representative of a daily paper, that "the result of testing meters is more often against the supplier than the consumer;" and this is confirmed by the results of tests contained in Mr. C. Stafford Ellery's recent Presidential Address to the Southern District Association. As to the figures in Mr. Stratford's report in regard to the meters tested for disputed registration, we have no great faith in such tests; for, as he acknowledges, these meters have to be disconnected and conveyed to the testing-station by van or otherwise, which is sufficient to disorganize any meter, and cause it to register incorrectly. With reference to the testing of meter indices, Mr. Stratford considers it would place upon gas consumers or ratepayers a burden of many thousands of pounds; and he says "the public have had no cause to desire such testing," no question of fraud having ever been suggested.

Weakness in Coalite Shares.

During the past week the shares of the Coalite Syndicate and of the British Coalite Company have been showing an instability that must be a little alarming to those of their shareholders who are not behind the scenes. Some holder or holders who know something more than the general rank of proprietors must be unloading himself or themselves of a burden that, it may be expected, will only grow lighter in respect of value. On Monday morning last week, the market report gave 5⅛–6 as the price of the Syndicate shares; yesterday morning they were quoted at 4⅝–5¼. The British Coalite Company's shares were on Monday morning last week quoted at 12s.–13s.; yesterday morning at 10s. 3d.–11s. 3d. There must be some good reason for this unsteadiness known to but an influential few. What is that reason? Is it that there has been further trouble with the plant at any one or more of the places at which it has been installed? Is it that rumours current at one of our fashionable seaside resorts are correct that, in a little town not far distant, people are complaining that coalite plant is an undesirable neighbour, and that it has been arranged that visitors during the summer months are not to be annoyed by its working? Or is it that coalite stocks are accumulating, and that the public are not opening their cellar doors for its accommodation with the freedom that the promoters prognosticated? Warmer weather is here, and the demand for solid fuel is rapidly declining. Coalite stocks under the circumstances will have a tendency to accumulate, and then next winter season coalite—the swollen, light-weight fuel—will have to come down in price to a competitive level with other solid fuels. A further idea flits into mind as a reason—that the beautiful scheme for generating electricity by gas-engines run by the Barking coalite gas, and supplying the current to factories to spring up round about the Barking plant after the fashion of Jack's beanstalk, may not be developing any better than other coalite projects. These are suggestions that occur as accounting for the recent restlessness of coalite shares. It is not expected that from the coalite centre of activity, there will be any reply or enlightenment as to the suggestions made, because the maxim of that centre now is "the least said, the soonest mended."

Parliamentary Representation.

At the time of the recent General Election, attention was called in these columns to the members of the new Parliament who, so far as is known, have direct or indirect connection with the gas industry; and this reminds that some time ago the Gas Companies' Protection Association decided to take steps to compile a list of all members of the House who, in administrative or shareholding capacity, are identified with the industry. Such a list would be valuable for keeping such members informed on all matters that come before Parliament affecting the interests of the industry. But what is also wanted are members who shall be recognized as being specially in a position to voice the views of the industry in regard to all questions in which it is concerned that arise in Parliament, and will do so as a matter of course, and not in any perfunctory manner. When, for example, the Coal Mines (Eight Hours) Bill was under discussion, there was no member who put before the House the views of the industry, although it uses (in round figures) some 16 million tons of coal a year. The Home Secretary at the time received a deputation from the Institution of Gas Engineers and the Gas Companies' Protection Association; courteously listened to what was said by Sir George Livesey and the other spokesmen; and, with the equally courteous dismissal of the deputation, apparently closed his mind there and then to what he manifestly regarded as mistaken views. Who was mistaken has been since abundantly proved. But within the House, the industry only had its views expressed by circularizing the members. No one stood up and specially laid the views before the House, and claimed for them consideration as coming from an important coal-consuming industry. Only incidental references were made to them. The subject now recurs on the revival by Earl Wemyss of a proposition for a resolution expressing the approval of the House of Lords that it would be for the public good that important trading and other representative societies should each name three members of the existing peerage in the current, and each succeeding, Parliament to speak and act on behalf of such societies on all questions in which they are interested, and that the names of the peers so nominated be entered in the journals of the House. The list of public bodies approving of the resolution is fairly representative of the sciences and arts and trade; but that is all that can be said for it. It is surprising that it is not more representative. The Institutions of Civil and Mechanical Engineers are not named, nor is the Institution of Gas Engineers. In the list of seventeen bodies, however, are mentioned the Gas Companies' Protection Association, Society of Engineers, Junior Institution of Engineers, London Chamber of Commerce, Machinery Users' Association, Surveyors' Institute, and Employers' Parliamentary Council—the last-named representing thirty Central Associations connected with the chief industries of the United Kingdom.

Photographic Illumination Comparisons.

Comparative photographs of lighting effects should, in fairness, be accompanied by explanatory matter, so that judgment may be made as to whether or not the conditions of lighting are approximately concordant, and thus also the value of the comparison. The "Electrical Times" has published, side by side photographs of the lighting of a street at Middlesbrough by electric and gas lamps. The picture of the street illuminated by, gas shows nothing—nothing but, as the daily newspaper reporter would put it, "cimmerian darkness"—beyond an intense light diffused over the gas lantern itself, with a halo round it, and a shadowy outlined window or two. It is marvellous how the people were able to grope their way along this street before the electric lamps were introduced. The street electrically lighted, of course, appears brilliant. But it is not explained (perhaps because it is obvious) that the street is now illuminated by electric flame arc lamps; while previously (this is not so obvious) it was illuminated by ordinary incandescent lamps of not the most modern types. The Corporation Gas Department had no opportunity of lighting the street to the best advantage with incandescent gas-lamps, as the Lighting Committee seem to have suddenly resolved to adopt electric lighting at all costs. Our contemporary makes omission also in not stating that one of the photographs is of electric lighting up to midnight; the other of "stand-by" gas lighting from midnight to dawn. The "Electrical Times" has likewise refrained from mentioning that the costs are approximately four to one, taking electricity at about 1d. per unit, and gas at 2s. 2d. per 1000 cubic feet—this being the full price of gas to all classes of consumers. The arc lamps were brought into use last August, when two side electric lamps on each column were supposed to give all the light necessary after midnight. These failing to satisfy, the gas-lamps were brought to the rescue; and the Gas Department have had to light them from midnight ever since. The Lighting Committee are now asking the Council to allow the flame arcs to remain in use throughout the dark hours. It is naturally regarded by the Electricity Committee as rather *infra dig.* to have gas-lamps of any sort acting as a stand-by to their flame arcs, and by their very use bearing silent testimony to the expense of the latter. However that is not the point of this comment, which is to show that the conditions of electric and gas lighting in this particular Middlesbrough street are so unequal as to withdraw all value from the comparative photographs of its illumination.

The Result of the Ballot.

The cloud has at last lifted from South Wales; and this time, let us hope, it has done so for good—or at least for some years to come. The ballot which was taken among the miners on the question of the acceptance or rejection of the proposed new wages agreement has resulted in an overwhelming majority—practically three to one—of votes being cast in favour of signing the agreement; the exact figures being 97,273 for accepting the terms, and 34,963 against. Thus the men have responded to the appeals made by their leaders, and by the Miners' Federation of Great Britain, and have also shown their good sense in averting a struggle in which victory to them might have proved but little less disastrous than defeat. The closing stage in the dispute was reached on Friday, when, at a meeting of the Conciliation Board, the owners were informed of the acceptance by the men of the terms, and the revised agreement was signed. The new arrangements came into operation on the following day—thus replacing the old agreement which was terminated on March 31. As the agreement now entered into is for five years, instead of three (which was the term of the last one), one should be fairly safe in assuming that peace will reign over the coalfield at any rate until the approach of March 31, 1915, after which date the arrangement will be terminable by three months' notice on either side. This will give the district a chance of recovering from the ruinous effects on trade of the strife which has been in perpetual evidence since the passing of the Eight-Hours Act. Already the prospects of a peaceful solution have had a good effect; for it is stated that a large number of buyers have come upon the market during the last few days for supplies of coal over the next nine months, and a good deal of business is now in course of being transacted. The new terms, it may be mentioned, provide for the continuance of the present rate of wages of 50 per cent. above the standard of 1879, until they are advanced or reduced in consequence of a change in the price of coal; and the fixing of a minimum of 35 per cent. with an equivalent value of 12s. 5d. per ton, and a maximum of 60 per cent. above the standard of 1879. The men shall not be under any obligation to work the extra sixty hours mentioned in the Eight-Hours Act; and the payment of six turns for five for night work shall continue, but payment for overtime shall cease. The owners do not press for double shifts in the face; but these are to be provided for in headings and for development purposes, and an effective afternoon shift will be required for clearance purposes—the payment for the latter to be similar to payments made for working present night shifts. There is also provision made for an overlapping shift, and for amending the Eight-Hours Act in order to legalize this on Saturdays.

Proposed Legislative Protection of Water Supplies.

In another column will be found the principal clauses of an important Bill affecting water companies which has been referred to a Joint Committee of the two Houses of Parliament. It provides that no water undertakers shall sink wells or construct works for obtaining their supply unless such wells and works and the sites for them have been expressly approved by Parliament. The Bill will amend the law in regard to underground water, by providing that wherever private supplies are injured by the abstraction of water for public supply by means of future works, the owner is to be entitled to compensation; and it will provide that where, by means of future works, water is taken from any district for supply to communities outside, the district whence the water is taken, and through which it is conveyed, is to be entitled to demand a share of such water for its own needs, upon terms to be agreed upon or fixed by the Local Government Board. It will be recognized that if the Bill is passed it will have a most disastrous effect on all water companies drawing their supplies from wells; and therefore their attitude should not be one of apathy in reference to it. We understand that both the Provincial Water Companies' Association and the Association of Water Engineers have been communicated with on the matter, and that it will be considered by the latter body at their meeting in York in June. We suggest that some definite united action should be taken at once; as by the time named it may be too late.

At the meeting of the Institution of Civil Engineers last Tuesday, it was reported that the Council had recently transferred Mr. S. C. Chapman, the Water Engineer to the Torquay Corporation, from the class of associates to that of members.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 134.)

During the past week the leading markets on the Stock Exchange had a very fair time on the whole, though the tendency now and then was oscillating and doubtful. In spite of themselves, they could not avoid being affected by the tremendous speculation going on hard by; and its ups and downs had a cheering effect and the reverse alternately. The opening day was bright and busy for almost all. Railways were active and rising, and the gilt-edged division held firm. The Rubber gamble was at high pressure. Tuesday was quieter and dullish at first, rather overborne by the excitement in the fashionable ring. But things improved later on—Consols among them. The weak American Market mended a little. On Wednesday, movements were uneven. Government securities were in demand, and Consols rose $\frac{5}{16}$; but rails were not so good. On Thursday, most departments were weaker, owing to the sinister influence of a shaky Rubber Market. When a big building tumbles to pieces, there is no knowing who may be hit by the *débris*. But the gilt-edged division went their own way, calm and steady. Movements on Friday were irregular; the choicest investments being rather easier. But Rails were cheered by improved prospects in the coalfields. Americans were weak; and some of the cautious ones got out of the Rubber ring. On Saturday, however, speculation was going strong again, and most departments (except Consols) were firm. In the Money Market, the position was firm. A rise in the Bank rate on Thursday was regarded as on the cards; but it did not come about. Business in the Gas Market was a fairly good average, and the tendency showed even an improvement. A large number of undertakings, situated all over the world, advanced in value, testifying to the unabated popularity of gas as a good, steady investment. Large parcels of stock have recently been issued by tender or by auction, and have been eagerly taken up. Last week, Gaslight and Coke ordinary made an advance of half-a-point with transactions ranging from 103⅜ to 104¼. In the Company's secured issues, the maximum realized from 88½ to 89½, the preference 105 and 105½ (a rise of 1), and the debenture 81½ and 81¾—a rise of 1. South Metropolitan was steady and more active; prices ranging from 120 to 122. The debenture made from 82 to 82½. Commercial 3½ per cent. was done at 103, and ditto debenture at 81. Among Suburbans and Provincials, Alliance and Dublin changed hands at 88, Brentford old at from 251 to 253 (a rise of 1), British at 44½, Bromley "B" at 88, and South Suburban at 121. Locally, Liverpool "A" made 223, and ditto "B" 164½. In the Continental companies, Imperial had a further rise of 1, with business at from 181¼ to 182½, ditto debenture made 94½ and 95 (a rise of 1), Union from 98¾ to 99½, ditto preference 139 and 140½, European fully-paid 24½ and 24¾ (a rise of ¼), Malta 4$\frac{13}{16}$ and 5, and Tuscan 9½ and 9$\frac{9}{16}$. Among the undertakings of the remoter world, Bombay realized 6⅜, Buenos Ayres 15, Cape Town 4½, Monte Video 13, Oriental from 141⅜ free to 142½ (a rise of 1), Ottoman 6 and 6⅛, Primitiva 7¾, and ditto preference 5$\frac{7}{16}$ and 5$\frac{9}{16}$.

ELECTRICITY SUPPLY MEMORANDA.

Fixed-Price Project—How a Weymouth Journalist meets Criticism—Look before you Leap—Interest of the Electricity Industry in Gas Restrictions—Innocent Clauses at Bath—A Lamp Maker's Imagination.

In the "Memoranda" on March 29 there appeared three-quarters of a column of criticism (not a column and four-fifths, please) of an article published in the "Weymouth and Portland Standard" on the fixed-price-per-lamp project, which criticism caused the Editor of our contemporary to devote the whole of his editorial matter—to the extent of upwards of a column—in a succeeding issue to what he thought fit to say about us, and not the fixed-price scheme, which is the real bone of contention. The importance, in the Editor's mind, of doing something to, if possible, take the edge off the criticism is thereby attested. But our friend could do no better with it than indulge in a fine display of terribly thin buffoonery, which was somewhat appropriate to the day of issue of his paper—April 1. In the whole of the balderdash on the subject which he thinks suitable for his readers, there is not a single denial of any one of the points that were made in our criticism, which the Editor, in the exercise of his intelligence, is of opinion "hardly merits a serious reply." But this statement is anything but in countenance with the devotion of his editorial pen and a column and more of his space to our comment. We asked the writer to inform us as to the names of those "several places" that have adopted the "fixed-price-per-light" system; we should like to hear from him as to the degree of success of the system in South London; perhaps he will tell us whether the Dundee Electrical Engineer's experience and recommendation are worthy of consideration; is there anything wrong with our criticism of the provision against misuse; whether the criticism of other electrical engineers (such as that published last week) has any value; has our friend any fault to find with our computations and conclusions? Not one of the points is dealt with or controverted by him. They "hardly," he submits, "merit a serious reply," though in them—whether or not the Council, the Electricity Committee, or the sapient Editor cares to accept our statements un-

corroborated—there is, we venture to think, sufficient to cause the Weymouth Council to pause before entering upon any speculative course, and to inquire as to their validity. It is easy to gibe at interestedness; it is not so easy to dispose of facts such as those in our criticism.

In the display of jocularity made by our contemporary, the writer had to descend to misrepresentation. There was no reference in our criticism to the "humorous fixed-price lamp;" it was the fixed-price-per-lamp "project" that was so described. And, again, there is a misstatement as to our criticism occupying one and four-fifth columns of the "Memoranda." But we will forgive our journalistic friend for these misrepresentations, as he was so hard pressed for points, and at a loss to give answers to our criticism. In view of the inaccuracies that were contained in the original article on the fixed price per lamp, it is interesting to learn that our contemporary's "attitude is, and has been, a perfectly impartial one," and that its "only interest in the new electricity scheme is a speculative one as to the result of its adoption." That was not the impression gathered from the original article. The "Southern Times," unlike its contemporary, takes a common-sense view of our criticism. While it does not expect to get an unbiassed judgment from the "JOURNAL," it says it would be imprudent to disregard the evidence which is presented of non-success in places in which the fixed-price-per-lamp principle has been tried. "As the fixed-light system comes to be closely examined, people are beginning to hope that the Committee charged with the management of the Weymouth electric light undertaking will make quite sure of their ground before they take the plunge which is to 'revolutionize' electric light consumption in the town. There seems to be a good deal of doubt about the commercial soundness of the project." We agree with our contemporary that the Electric Light Committee are to be commended on any sound scheme that may be adopted for popularizing the illuminant they sell; but it is only right that the Committee should "make assurance doubly sure, before they make a plunge which may possibly prejudice the future of this important municipal enterprise." The fixed-price-per-light project is as speculative as free wiring. The Electricity Committee have no power to compel a man to stay in his house after he has had it wired on the fixed-price plan, nor have they any check on the amount of electricity he will consume. In free-wiring the Beckenham Council have (as recently stated) sunk £22,613; and the rental last year only amounted to £935, and, after meeting interest and sinking fund, there was a deficit of £1708! It will be the best thing for Weymouth, and any other place that may be considering the fixed-price-per-lamp project, to look well before taking the leap. That is a more prudent policy than trying to meet criticism by cheap wit, instead of facing it fairly and squarely, and seriously.

In the "Electrical Review," there is a peculiar article on "Gas-Testing Standards." It is very superficial and very vague; and, as a matter of fact, it is difficult to determine in parts what the writer of the article means, and we are positively at sea as to where he obtained certain of his priming. There appears to be an extraordinary amount of interest just now on the part of the electrical industry in advocating that greater restrictions should be placed on the prime commodity of their competitors. In this article, it is stated that gas may be varied in its composition, and that its value as an illuminant does not necessarily correspond with its efficiency for heating and power purposes; and, this being so, users of gas and the safeguarding authorities should consider the need for closer and more scientific methods of checking the gas distributed than was found necessary when the flat-flame burner was exclusively used. This is delightful coming from an electrical source, in view of the little protection for consumers in the way of penalty testings that hangs over the electrical industry. But what would this self-constituted handicapper of the gas industry like in the way of closer and more scientific methods of checking gas? The only possible test in addition to tests now imposed would be a calorific power one; and the gas industry, after a proper decision on the point of the correct standard under local circumstances, would be quite prepared to accept such a standard in lieu of the illuminating power one. Surely, the gas industry's worst enemy would not wish it to work concurrently to two qualitative standards with penalties attached. The gas industry is most desirous of seeing the flat-flame burner dropped out of the reckoning altogether, so that calorific power alone is the only thing to trouble about in the matter of quality; and the cancelling of the illuminating power test would certainly hasten the eviction of the antiquated and wasteful burner. The writer in our electrical contemporary holds that, on the adoption of the "Metropolitan" No. 2 burner, there should be a reduction of price, or a calorific test should be imposed. Thanks are due to him for his disinterested recommendation. But the reasons why neither the one nor the other proposal should be adopted may be found by him in our recent series of articles on "The Case for the Standard Burner Bill." The suppliers of gas are fully aware of where their best interests lie; and they may be depended upon to defend those interests in a sane manner. The consumers, in the case of sliding-scale gas companies, are amply protected in regard to price. The electrical writer, however, asserts that, where the illuminating power standard is 16 candles, the adoption of the new burner would represent a loss of about 12½ per cent., but a rebate of 2d. on 2s. 6d. per 1000 cubic feet would only amount to 6¼ per cent. Following up which gas suppliers are told something that, though the No. 2 burner has been extensively applied, they had not learned until this writer voluntarily came forward to enlighten them. Our obligations, of course, are deep and sincere. Gas suppliers, read, mark, learn, and inwardly digest this: "The gain to the supplier is greater than the difference between these figures, owing to the general tendency to burn more gas, and the economy to be effected in fuel and treatment at the works." The writer has something to learn as to the possibilities of producing gas of much lower illuminating power without degrading calorific power. We should like the writer to also expatiate on these mysterious statements in order to remove the ambiguity: "With the exception only of sulphuretted hydrogen, the impurities cannot be checked, although they cause great destruction of property, and have a most injurious effect upon those who use gas lighting in unventilated places." It is some years since the "Metropolitan" No. 2 burner came into use; and nothing has been heard from the consumers as to any detrimental influences which entitle this writer to assume that they are unfortunate, and will be all the better for a little of his gratuitous sympathy.

It will be within the recollection of readers that the President of the Southern Association of Gas Engineers and Managers (Mr. C. Stafford Ellery), in his Inaugural Address, handled somewhat severely the vicious methods of the municipal traders in electricity supply, from which vicious methods he, as the responsible chief officer of the Bath Gas Company, has suffered in company with others similarly circumstanced. It is not surprising to find that the Company are unwilling to leave a stone unturned to get the business of the municipal electricity undertaking conducted in a fair manner. A gas company do not mind how spirited electrical competition is, so long as it is conducted on true and just commercial lines. The Electric Lighting Committee of the Corporation are now proposing that the latter should apply for a Provisional Order to extend the area of electricity supply; and the Gas Company are intending to oppose the application, solely for the purpose of obtaining the insertion of two clauses innocent of any object but fair dealing. The first clause is to provide that the charge made to the Corporation for public and other electric lighting shall not exceed the price to private consumers. The second provides that, in the event of the undertaking becoming a charge on the rates, the prices of electricity to private consumers should be periodically raised so as to cover losses necessitating such charges on the rates. The Council, it is stated, object to the insertion of both clauses. We wonder why. What is there in them to which any honest trader can object? They are both based upon true commercial and financial principles; and the latter clause is simply an abbreviated way of putting the terms of the Northumberland clause, which contains principles and regulations already approved by Parliament.

A representative of the "Electrician" has had an interview with Mr. A. Denman Jones, the Manager of the Jandus Flame Arc Lamp Company; and this gentleman has given the representative some "interesting information" on the subject of the competition of the flame-arc lamp with high-pressure gas-lighting. The "interesting information" has been duly chronicled as gospel. We learn that "there are numerous places where the Jandus lamp has displaced gas, simply and solely owing to the trouble of constantly renewing the mantles." Where are those places, we should much like to know? "With high-pressure gas, although the light given when the mantle is new is excellent, it falls off very rapidly; and the mantle life not infrequently is very short. The upkeep costs are therefore large; and an arc lamp which requires attention only once every four days, and then only 'cheap' attention, is being gradually found to possess certain distinct advantages." Purely by oversight, Mr. Jones forgot to mention that there are places where flame-arcs have quite recently been displaced by high-pressure gas lamps, simply and solely owing to the greater expense of the former, and the higher efficiency and constancy as illuminating agents of the latter. The "Electrician" ought to have known better than to have accepted as true the statement that with high-pressure gas the light falls off very rapidly. That is just what the light does not do with high-pressure gas, as the high-pressure lamps in Fleet Street amply bear witness. We suggest, too, that Mr. Jones should get a little more accurate information as to the average renewal of mantles, and compare it with the average renewal of arc lamp carbons, before he speaks again of the trouble of constantly renewing mantles.

We really admire the audacity of Mr. Denman Jones, in view of what is being done in the electricity-supply industry, in saying that gas-supply authorities have often taken on street lighting at a figure which only allows them to lose instead of make a profit. To this our contemporary appends the sage remark: "An arrangement which, in the long run, is likely, we should imagine, to lead to trouble for the shareholders." We should like Mr. Jones to point to a single piece of high-pressure street gas lighting in London that has been taken on at a price which causes a loss. One more quotation which shows that Mr. Jones has a grand imagination. Here it is: "High-pressure gas has, to a certain extent, also been tried for factory lighting; but the necessity for having a trained gas engineer on the premises to look after the pressure-raising installation, and the high cost of renewals, is causing a revulsion of feeling in favour of flame-arcs." There is something slighting in the words "to a certain extent" and "tried;" and the "trained gas engineer" for looking after pressure-raising plant is a happy piece of fiction. The fact of the matter is that the high-pressure gas system has become so popular for factory lighting, that those who supply high-pressure gas-lamps are doing a

splendid business in this direction. Has our contemporary so soon forgotten the tribute paid by Colonel Bagnold and Colonel Sir H. Barlow to high-pressure gas-lamps for factory lighting (as the result of their experiences at Woolwich Arsenal—see "JOURNAL," March 15, pp. 715, 731), and the statement of the latter that he would "no more think now of putting in arc lighting than think of flying"? Colonel Bagnold and Colonel Sir H. Barlow, we might mention, are not interested in the management of the Jandus Flame Arc Lamp Company. However, readers who desire to see what Jandus lamps will do should go and see the performance of the four erected at the Abbey end of Victoria Street, Westminster. The road is not uniformly lighted; and that end of the street at nightfall looks most dreary. The old double upright burnered gas-lamps in the next stretch of the street are doing better in regard to uniformity in illuminating the roadway and footpaths. Distinctly better than the flame arcs in effect are the succeeding electric metallic filament lamps; but best of all are the low-pressure inverted gas-lamps in the last part of the street.

PERSONAL.

Mr. W. B. MIMMACK, formerly of the Crays Gas Company (now absorbed by the Bromley Gas Company), has been appointed Manager of the Pembroke Docks and Town Gas Company, Limited, in succession to Mr. A. Horace Brookman.

Mr. J. DICKSON, who last week took over the duties of Manager of the Forfar Corporation Gas-Works, was (before he left Kelty) presented with a timepiece, which had been subscribed for by the employees at Kelty, as a mark of their esteem for him.

Mr. CARL BENNETT, who has served the Herne Bay Gas and Coke Company, Limited, as Assistant-Manager (under his father, Mr. C. V. Bennett), succeeds at Dartford his brother, Mr. W. H. Bennett, who, as announced last week, will shortly go to Redhill to take the position vacated by Mr. James Paterson.

On the afternoon of Saturday last, Mr. H. RULE, formerly the Assistant-Manager of the Falkirk Corporation Gas-Works—now Manager at Kelty—was at Falkirk presented by the employees and friends with a gold watch and albert, with sovereign case. The presentation was made in the gas-works by Mr. W. Wilson, the Engineer and Manager.

As will be noticed from the report of the proceedings of the Midland Junior Gas Engineering Association, the announcement was made during a visit on Saturday last that Mr. HAROLD E. TEMPLE, the Hon. Secretary, has secured the appointment of Assistant Engineer and Manager to the Christchurch Gas Company, New Zealand. Mr. Temple is at present engaged as Assistant Works Engineer at the Nechells Gas-Works of the Birmingham Corporation. He received his training under Mr. Charles Hunt at the Windsor Street Gas-Works; commencing there as assistant in the works laboratory in 1896, and being under Mr. P. C. Holmes Hunt (now of Melbourne) for some few years. He was subsequently promoted to the post of Analyst in 1902, and in 1905 was appointed by Mr. Henry Hack as Works Engineer's Assistant (under Mr. John Foster) at Windsor Street; being transferred to Nechells, a further promotion, in November, 1906. He succeeded Mr. James Hewett as Hon. Secretary of the Midland Junior Association, and is held in the highest esteem by his colleagues, who are all pleased to hear of his success. We understand he sails for New Zealand on the 28th inst.

OBITUARY.

Mr. DAVID WILLIAMSON, J.P., the Chairman of the Guildford Gas Company, died last week at the age of seventy-seven.

The death is announced as having taken place on the 16th ult., at the age of 79, of Dr. HANS LANDOLT, Professor of Physical Chemistry at Berlin. In 1856, Landolt made (in conjunction with Lunge) the first exhaustive investigations on the Bunsen gas-burner. Later he collaborated with Börnstein in the compilation of the elaborate tables of physical and chemical constants which are now regarded everywhere as indispensable for scientific and technical calculations. His other work was of a more purely scientific character.

Yorkshire Junior Gas Association.—A meeting of the Association will be held next Saturday at the Municipal Technical College, Bradford, when Mr. J. Demain, of Garforth, will read a paper on "The Development of a Small Gas Undertaking," and Mr. W. Cranfield will give an address on "Modern Developments of Carbonization, with Special Reference to Vertical Retorts."

Gas Managers as Municipal Councillors.—At the suggestion of several friends, Mr. E. D. Sapey, the Manager and Secretary of the Horsham Gas Company, Limited, offered himself as a candidate for one of the vacancies on the Town Council, with the result that out of the eight candidates nominated, he was on Monday last week returned fourth on the list; those in front of him being three of the retiring members who had offered themselves for re-election. We congratulate Mr. Sapey on his success, and venture to predict that he will prove a useful guardian of the ratepayers' interests.

NOTES FROM WESTMINSTER.

PROCEEDINGS last week in the Committee rooms were peculiarly interesting, with a couple of days spent on the Standard Burner Bill and four days on the Glasgow Gas Bill. It will be the week of the session so far as actual gas fighting goes; but the current week for the gas industry in connection with the Standard Burner Bill and for Glasgow in connection with its own gas measure, will be the more momentous. The opposition to the Matlock Bath Bill has been withdrawn, so that this means there is to be no insistence upon the removal of the gas-works; for sparing them the expense in connection with which, the people more immediately concerned will be truly thankful. The Mallow Gas-Works and the Worksop Water-Works, it will be seen later, are to change hands, and become the possessions of the respective towns, provided, of course, there is no hitch in the exercise of the powers. The Brighton Town Council, it is understood, are not satisfied with the 1d. clipped by the House of Commons Committee from the standard price of the Gas Company in connection with the adoption of the "Metropolitan" No. 2 burner; and they have decided to contest the Bill in the House of Lords. This is unkind; but we venture to predict that the event will show that the Council are now taking an extremely fatuous course.

Standard Burner Contest. On Thursday morning, Lord Ritchie's Committee commenced consideration of the Standard Burner Bills (Nos. 1, 2, and 3), commencing with No. 1. To the gas *habitué* of the Committee rooms, the scene in No. 3 was an unwonted one. One is accustomed to see, and to rub shoulders day after day with, the consulting gas engineers of Westminster, and the gas officials of the town immediately interested in a Bill. But the public part of the Committee room in which their Lordships sat on Thursday and Friday to consider these momentous Bills was practically packed by gas engineers from North, East, South, and West. The gas man, wherever he stood or sat, found professional friends to the right of him, friends to the left, friends in front, and friends behind. This is not to be wondered at, seeing there were 47 Gas Companies—21 maximum price, and 26 sliding-scale—jointly concerned in the promotion of the Standard Burner Bills, though there had been certain secessions by Companies who, under their existing testing powers and prescribed burners, did not think it worth while to incur the opposition of the local authorities for the small advantage, under their special circumstances, that the "Metropolitan" No. 2 burner would have conferred. Practically all the companies, however, must have been represented in the room by their technical officers. The opposition had followed the excellent example of the promoters, and had arranged for a joint case, with one set of counsel and witnesses. The Agents for the Bill (Messrs. R. W. Cooper and Sons), it was evident, had prepared themselves for a strong attack by having the case for the Bill thoroughly well grounded and submitted, and backed in a manner that would, from the very nature of the evidence and the manner of its presentation, commend itself to the Committee. Mr. J. D. Fitzgerald, K.C., Mr. Honoratus Lloyd, K.C., Mr. Hutchinson, and Mr. Paddon were Counsel for the promoters; and Mr. Ram, K.C., Mr. J. G. Talbot, K.C., and Mr. Courthope Munroe were for the opposition. This was a strong representation, and showed an intention on both sides to sustain a strong part, *pro et con*. The witnesses called in support of the Bill were, in order, the inventor of the "Metropolitan" No. 2 burner—Mr. Charles Carpenter—Mr. W. J. A. Butterfield, Mr. W. C. Young, Mr. J. W. Helps (the President of the Institution of Gas Engineers), Mr. Edward Allen, Mr. Corbet Woodall, and Mr. William Cash. As customary, the inseparable supporters of local authorities hostile (or, if not hostile, concession-desiring) to the adoption of the new burner—Mr. Isaac Carr and Mr. J. G. Newbigging—were at the back of the opposing Counsel, and Professors Percy Frankland and Teed were with them. The proceedings continued over the Thursday and Friday sittings, and then were adjourned to yesterday, when it was expected that the winding-up speeches of Counsel would be made, and the decision of the Committee would be delivered.

The Opening. It was a cogent argumentative opening that Mr. Fitzgerald made on behalf of the Bill. The history of the test-burner question was detailed by him in a way that early put their Lordships into possession of the difficulties under which gas testing has been carried on, of the injustice to gas suppliers of the use of instruments in testing that do not give them the full illuminating value of the gas, and of the fact that the present promoters are only asking that they should have conferred upon them that to which they have a right under the fundamental parliamentary principle applying to the testing of gas, that the burner shall be the most suitable for developing the illuminating power of the gas. Further, that for the penal testing of the quality of any commodity there should be uniformity in instruments and procedure. He showed that, before the advent of the "Metropolitan" No. 2 burner as the result of the research and work of Mr. Charles Carpenter, gas testing was in a chaotic state; but in this burner, which has been conceded by Parliament and the Board of Trade (august bodies of whom Mr. Isaac Carr thinks slightingly in respect of their knowledge of this subject)

to be the most suitable for the purpose, gas suppliers have an acceptable instrument for the testing of all the ordinary qualities of gas. Counsel made the point that both Parliament and the Board of Trade in the Private Gas Bills and Provisional Orders that have respectively come before them since 1905 have prescribed the use of the new burner, and have moreover specified it in the Model Clauses. The gas suppliers who have applied and obtained the new burner as their standard one, he pointed out, include not only companies, but local authorities; and the latter are not all averse to having the burner, though there are no means within human ken by which the consumers of the gas of those authorities can be protected in the definite manner proposed for gas companies by Messrs. Carr and Newbigging, both of whom are the officials of local authorities, one of whom (despite the protest of Mr. Newbigging) takes many thousands of pounds a year from the gas consumers for the rates. After the opening of learned Counsel, a question of principle was discussed; Mr. Ram, in his pious regard for the process of the House of Lords, looking upon the joint promotion of these Bills as not only a misuse but as an abuse of that process. The Sulphur Compounds Acts are precedents against him; and as Lord Ritchie and his noble colleagues, together with the authorities of the House, did not feel at all aggrieved over a number of Companies taking the sensible course of combining applications and case for one purpose, Mr. Ram's intervention in this matter did not avail him anything.

And Evidence. There is hardly need to even glance at the evidence submitted for and against the Bill. Practically there was nothing new in it. All that can be said has been said before, and in numerous different ways. Mr. Carpenter made his evidence particularly interesting to the Committee. One point that has been made time and again in opposition to the "Metropolitan" No. 2 burner is that it does not comply with the principle that the test-burner must be practicable for use by the consumer. The barrier to the "practicable" state, it has always been submitted, is the cost of the burner; but Mr. Carpenter showed that, if the public demand "Metropolitan" No. 2 burners for lighting in the same way that they used to demand the old-time argands in pre-incandescent days, then the new burner could be made and sold at the prices that were paid for the argands of old, around which, in these times of incandescent lighting, clusters not utility but merely historical interest. It is all a question of demand. There was really no case to meet as to the suitability of the burner as a testing-instrument, or as to it doing better justice to the illuminating value of the gas. The ancient principle and right that the most suitable burner should always be used for the purpose of testing, which left open the way to improvements in the burner, and contemplated no stereotyping of it, Mr. Carr and Mr. Newbigging sought to amend by linking up with principle and right some distinct concession (something not provided for by Parliament at the beginning of history in statutory gas testing) for the consumers other than the advantages that would accrue to them through other statutory conditions and by the ordinary commercial routes. It is conceded by the promoters that, while under the altered circumstances of the time, gas consumers can utilize a lower grade gas to better advantage by modern means than the higher grade gas through the better intermixture of gas and air, there are also economies that can be effected, through the adoption of the new burner, in manufacture—by increasing the make per ton of coal, for instance—of which the consumers, through the statutory protection afforded them, will take the larger part, whether the suppliers be a maximum-priced company, or a sliding-scale company. Mr. Woodall, Mr. Carpenter, and others showed how these advantages inured to the consumer, without any parliamentary interference whatever, particularly in respect of the standard price on which investors have provided capital for the concerns. But Messrs. Carr and Newbigging see visions of possible mismanagement on the part of companies, and nothing will please them but to get them properly corded up in this matter. A great deal more evidence from the photometer room was advanced showing much theoretical suffering on the part of gas consumers, which suffering is not reflected in those practical things known as gas accounts. Liverpool particularly came in for intimate attention in this connection; that being a Company, with maximum price and high-grade gas, incorporated in the No. 1 Bill. There is a sympathetic regard on the part of the opposition for the flat-flame users of Liverpool, who have been wasting good gas and blackening their ceilings, instead of adopting incandescent burners. It will be an excellent thing for them if a lower-grade gas served as an inducement to the use of less gas, and in a more profitable manner, by means of incandescent burners. Nor is there any occasion to worry about the gas-engine user of Liverpool; seeing that higher authorities on gas-engines than the opposition technical witnesses—namely, Mr. Dugald Clerk and Dr. John Hopkinson—have affirmed that greater efficiency can be obtained from gas-engines by low-grade illuminating power gas than by one that is so rich in heavy hydrocarbons that proper admixture of air cannot be secured. A calorific power test received constant reference in the evidence; but the opposition did not seem to press the point much. The opinion was expressed by Mr. Butterfield that the Gaslight and Coke Company will have some difficulty in maintaining their calorific power standard, if they work down to their legal obligation in respect of illuminating power. Mr. Woodall, on the other hand, states that the acceptance of the test has not been accompanied by any special inconvenience; but he admits that it has been found, when working to a certain illuminating power, that they are not able to maintain the calorific power specified in their Act. Among other *dicta* worth remembering is Mr. Butterfield's assertion that the change in illuminating power as indicated by the No. 2 burner involves a relatively small change in calorific power.

[Reference to yesterday's proceedings appears in our editorial columns.]

Glasgow Gas. The outside districts within the gas supply territory of the Glasgow Corporation have taken, in the attempt to secure something to which they are not entitled, complete advantage of the application of the Corporation to Parliament to consolidate their Gas Acts and to have them revised. The Bill originally took the form of a Provisional Order it was proposed to prosecute under the Scottish Procedure Act; but, probably in view of the vastness of the inquiry, the scene of investigation was transferred to the Committee rooms at Westminster. Mr. Balfour Browne, K.C., led for the promoters; and with him were Mr. Honoratus Lloyd, K.C., and Mr. Beveridge. The opposing Counsel presented a solid phalanx, portending a vigorous and protracted discussion. There was fulfilment. The discussion went on unceasingly day by day from Tuesday; and the opponents' case was still in full swing when the Committee rose on Friday. To a large extent, the matters under discussion purely refer to the regulation of the relations between Glasgow and the outer districts. But still in them questions of principle are involved. One submission by the outside districts was early disposed of; and that was that the time has arrived when there should be a Joint Gas Board. But this was going beyond the bounds of propriety. Mr. Balfour Browne rightly contended that such a matter should be raised on a Bill specially promoted for the purpose; and though at first the Chairman of the Committee appeared to think the proposal germane to a Bill contemplating new powers, on after-consideration the Committee were of opinion that it was not within their province to consider an alternative scheme on the present measure. No question was raised as to the reduction of the standard illuminating power of the gas to 14 candles; but there was strenuous contest on other matters as to which confirmation of existing powers is asked, and which to an extent bear upon the desire of the Corporation to have the area of supply divided into two districts, to be known as the city supply district and the supplementary supply district. Among the witnesses called in support of the Bill were Mr. W. W. Montgomery, the Convener of the Gas Committee, Mr. Alex. Wilson, Mr. Corbet Woodall, Mr. Charles Hunt, and Mr. W. R. Herring. Mr. E. H. Stevenson was looking after the interests of certain of the opponents.

Controversial Points. The principal controversial questions referred to differential prices and the allocation of gas profits. The times for gas supply have changed; and conditions have so altered that business for different service cannot be conducted with that uniformity of prices that at one time prevailed, nor is it just that the districts beyond the confines of a city should expect to be supplied on an equality with the inner area. Glasgow, among municipal gas undertakings, occupies a leading place in the matter of generous treatment to their gas consumers; and the Corporation have only, we believe, once since the gas undertaking became a municipal concern, taken a few thousands from the profits in aid of the rates. The undertaking has been deliberately run on the politic lines of the best possible service for those who desire to take advantage of the service. The present price is 2s. for lighting, 1s. 8d. for power, and other prices for other purposes. The outer districts have enjoyed the liberal treatment of the municipal administration; they have enjoyed so much that they want to tie the hands of the Corporation in such a manner that there may be no preferential treatment of the city consumers or of the city public lighting. The Railway Companies, too, want to be placed in a preferential position. The power in the matter of differential rates at present possessed by the Corporation is a little obscure; and this obscurity the Corporation by the Bill seek to remove. What they propose is fair and reasonable, and not only so but is customary—perhaps, almost generally, in rather a less reasonable degree. What the outside districts desire is that the Corporation should not have the power to differentiate as between city and outer districts, though there is no particular objection regarding differentiation as between purpose and purpose. From the evidence however, especially of Mr. Wilson, it was apparent that there was no desire to make any difference except under special circumstances. It was evident throughout the proceedings that the outer districts were opening their mouths as widely as possible, while there was the opportunity. As to the proposal to continue the practically unexercised right to transfer profits in aid of the rates, it is, of course, natural that the Corporation should desire to retain the discretion. Their action in the past, and the present price of gas, are commendations for complying with this desire, though, as a matter of principle, there is an objection to complete liberty, and a definition of allowable appropriation is, from our way of thinking, highly requisite in all cases.

Mallow Purchase. It was not thought unlikely that, when the two Mallow Gas Bills got before the Select Committee presided over by Mr. Armitage, the one promoted by the Council for purchase powers would be allowed to go through without much opposition by the Gas Company, provided the latter could obtain what they considered to be satisfactory conditions regarding the determination of the price to be paid by arbitration. The anticipation was realized. The

Company is a small one, making probably only between 5 and 6 million cubic feet a year; and, as is usually the case in small towns having to deal with few and little affairs, what were considered to be sins of the Company in conducting their operations have been magnified into the most heinous offences. The Company could not help the geographical position of Mallow (which caused their working expenses to be considerable), nor could they help the smallness of the population, both of which conditions assist to rule the price that has to be charged for gas. On the Company now approaching Parliament to place themselves under statutory obligations, and to be invested with statutory powers, learned Counsel (Mr. Freeman, K.C.) seriously assert that their only object was to improve their position, and to increase the price which they would get from the local authority on purchase. Mr. Freeman knows as well as anyone that, when powers are conferred on a non-statutory company, it is an easy thing to obtain a sterilization clause, which will, within a defined period for purchase, prevent any accretion of value in consequence of the new powers. But in this case, it was sought in the opening to make the Committee believe that it was not the good of the concern and of the consumers generally that the Company were seeking through Parliament, but that the Company had the one and sole motive in view of enhancing the selling value of their concern. However, while the Company objected to expropriation, their resistance was not very strong; but they did raise most serious objection to the purchase price being committed to the decision of an arbitrator appointed by the Board of Trade, instead of on the usual lines provided by the Lands Clauses Act. Such an appointment by the Board of Trade is not uncommon—a case in point being the Amman Valley purchase. However, the Committee on this matter were in favour of the Company, but against them on certain conditions that they wished to attach. But the main objection being removed, the course was easy to the Purchase Bill proceeding, and the Company's Bill being withdrawn.

Worksop Water Purchase. In 1902, the Worksop Urban District Council promoted a Bill for the purpose of obtaining authorization to the purchase of the local Water Company; but the Local Government Board interposed with a report which pointed out that the loans of the town outstanding were equal to the assessable value of £52,000. The Board did not consider this at all a satisfactory position, nor the circumstances appropriate, for the purchase of the concern; and therefore the application for powers was then refused. A change has since come over Worksop; and its financial position has been considerably strengthened, with the result that not only do the Board now support purchase, but the Local Legislation Committee last week passed the preamble of the Bill conferring purchase powers on the Council. The purchase is to be by arbitration. The Company sought to have it specifically stated that the transfer was a compulsory one; but this the Committee declined. They, however, recognized the fairness of a request that notice of purchase should be given within six months. The Company also applied for the costs incurred in promoting their Bill last session, but this was not allowed, though a little *solatium* was given by the granting of costs, within limits, of appearance in connection with the present Bill. Compensation to officers was also allowed in three cases, providing their services were dispensed with within three years "without proper cause," which vague phrase is to be elucidated in the Act.

Visit of German Gas Managers to England.

The "Journal für Gasbeleuchtung" of the 9th inst. contains an official announcement by the Council of the German Association of Gas and Water Engineers in regard to the projected visit of members of the Association to England next month. It is stated that the original invitation of the Institution of Gas Engineers to their German colleagues proposed that they should also participate in the proceedings of the meeting of the Institution on the 14th to the 17th of June; but as the meeting of the German Association had been fixed for the 20th to the 27th of June, and at a place so far distant from England as Königsberg, it was decided that the visit, if arranged for this year, must be made quite independently of the meetings of the two bodies. The Institution of Gas Engineers were enabled to say that the German managers would be heartily welcomed if the trip were fixed for the middle of May; and this has now been provisionally settled. It is intended that the German gas engineers shall make a circular tour of about eight days' duration of the gas-works of England and Scotland, at which the more technically important and interesting novelties are to be seen. The German Association has already circularized its members in regard to the visit (which is intended only for managers of gas-works), and has received so many applications from intending participants that only a limited number of further applications can, it is said, now be entertained. The number of those taking part in the visit has had to be restricted in view of the organization of the tour and the visits of inspection.

Mr. H. J. Rydon, a Director of the Harrow and Stanmore Gas Company, left £126,107.

The Middleton Town Council have increased the salary of the Gas Engineer (Mr. C. F. Broadhead) by £50 per annum; and the Warrington Town Council have raised that of the Assistant Gas Secretary (Mr. W. S. Howard) by £20 per annum.

SUGGESTIONS FOR THE HOME.

VISITING on the opening day (last Friday) the "Daily Mail" Ideal Home Exhibition at Olympia, one could not but be struck by the welcome absence from it of that air of unreadiness which is so often present during the early days of such displays. Everything was in "full swing;" and not much more than a glance was needed to carry conviction to the mind that the promoters have arranged what is destined to be a highly popular show. The original and main object of the exhibition is officially stated to be "to promote the study of, and stimulate interest in, the making of the ideal home." A laudable object, truly. And if there are ideals and ideals—well, Olympia should be able to satisfy all. From pianolas to a new form of caster, is a far cry; but both are on view here—and all the intermediate stages of house furnishing as well; while in the gallery there is a section dealing with that indispensable feature of all ideal homes—the baby. But of all the many attractions, some of which will appeal to one portion of the visitors, and some to another, there is one which, it is safe to say, will prove an attraction to all, and that is the Tudor Village, which occupies the whole of the annexe. This is a really delightful creation. Here are old-world shops and houses, and old-world people. A veritable glimpse of the long past! Though not able to speak from actual experience, one would say that the village is complete. Certainly such historic features as the stocks and the whipping-post and the most primitive forms of fire-extinguishing appliances have been included; and there is on the village green "the ducking-stool for nagging wives and witches—a XV.-XVI. century punishment." With what different feelings may this last-named device be regarded by perhaps a few of the male visitors, and by assuredly the great majority of the ladies who pause to look at it!

However, it was not with a view to describing the various articles of beauty or utility that have so far been referred to that a representative of the "JOURNAL" visited the exhibition a few hours after it had been declared open by Her Royal Highness Princess Christian, but to see to what extent gas—that necessity to the modern household—was in evidence. Gas is represented, though perhaps not to the extent that might well have been the case, in view of the vast amount of comfort and convenience that can be secured by its aid in the home. The efforts of the seeker after any special items are assisted by the division of the exhibits into sections, though the manner in which the walks between the stalls are arranged might possibly lead a visitor with no leaning towards any particular branch to miss some of them. All paths, however, are so clearly shown on the map procurable on entering the exhibition, that it is not a matter of difficulty to find the way to any desired section. To begin in the middle (which, though apparently the wrong way of managing a tour, is, in view of the prominence of the exhibit, what ninety-nine out of a hundred people will probably do), there is an excellently furnished Central House, in the kitchen of which one is pleased to meet an up-to-date Davis cooker—an object that excited the obvious admiration of several ladies who were near the writer when he saw it—and an equally useful Wilson circulator; while in the upstairs rooms the Gaslight and Coke Company have fitted one or two attractive gas-fires. Some neat little inverted brackets have also been installed by Cash and Co., of Caxton House, Westminster.

Coming to the Lighting and Heating Section, the first stand is that of Messrs. Charles Toope and Son, of Stepney Square, E., who show gas and other heating apparatus for greenhouses, &c. Messrs. Tilley Bros., of Kingsland Road (with which firm is associated the Tilley High-Pressure Gas Syndicate, Limited), exhibit their "Hot-Ray" gas-fires, fitted with "Tree" fuel, and also gas-compressing plants. One of these compressors is water driven, and is primarily intended for use by gas consumers who have no motive power on their premises. By its means, it is stated, gas can be delivered at any uniform pressure up to 40 inches. The other type is suitable for larger installations, to raise gas pressure to 60 inches or more. It can, of course, be driven by an electric motor, a gas or air engine, or from existing shafting; and it is claimed that the compressor is simple and automatic in working. It bye-passes low-pressure gas to all the burners immediately the plant is stopped—thus ensuring a light under all conditions. The stall is brilliantly lighted by different kinds of lamps consuming gas compressed by these plants. The Birmingham Guild, Limited, of Newman Street, W., are well known for their artistic gas and other fittings, as is also Mr. Thomas Potterton, of Balham, for his cooking and water-heating apparatus, using gas and coal fuel. Messrs. Masters and Andren, of Great Tower Street, E.C., have on view their "Duck" ovens and breakfast cookers, under which a gas-ring or oil-stove is intended to be placed.

A number of the specialities of Mr. William Edgar, of Hammersmith (including the Blenheim gas-fire), are to be seen, as well as the "Bosco" self-igniting incandescent gas mantle of Messrs. G. Limmer and Co., of the Strand. The Planet Foundry Company, Limited, and the Elbard Stove Company, of Guide Bridge, exhibit cooking and heating apparatus, and patent toasters; one appliance being a combined toasting and boiling stove, hot plate, and hot cupboard, fitted with three burners, and suitable for hotels and other large establishments. Messrs. James Stott and Co., of Queen Victoria Street, exhibit in action their well-known governors for lights, fires, and cookers; and also the "Elf-in-Cave" gas radiator—a very small portable appliance, weighing only about 1¼ lbs. Geysers of all kinds are seen on the stand of

Fenlon and Son, of Tudor Street, E.C.; and Telephos, Limited, of Farringdon Avenue, demonstrate the action of their device for lighting and extinguishing gas, which can be applied in connection with any upright or inverted burner. The exhibit of the Standard Range and Foundry Company, Limited, of Watford, includes some gas and other fittings. Messrs. Bratt, Colbran, and Co., and the Heaped Fire Company, Limited, of Mortimer Street, W., display a selection of their patent grates for use with either coal or gas. These "Heaped" fires are made by the firm in many handsome patterns. There are no front bars; the fuel being merely heaped against the fire-brick back, and the gas supply run in underneath the grate.

The Parkinson Stove Company, Limited (now incorporating Maughan's Patent Geyser Company), of Birmingham, are showing various types of water-heaters in action. Three geysers are at work over a bath—viz., the "New Teba," fitted with the patent safety gas-valve which automatically cuts off the supply of gas should the water fail through any cause, the "Simplice," a cheaper type with interlocking gas and water cocks, and the "Holywell." Over a basin is the new pattern "Pearl" geyser—an effective, inexpensive article for instantly producing hot water in comparatively small quantities of about 3 quarts per minute. There is also the "Gacylote" automatic cylinder, which is an independent self-contained hot-water apparatus for supplying hot water to any point in the house; the gas being automatically controlled by a thermostatic valve. Special attention is drawn to their new pattern "Holborn" circulator, which is a well-made article, for which extreme efficiency in working is claimed. There is here an entire absence of cross tubes or extra chambers; the apparatus having only a single chamber, all joints of which are thoroughly seamed and riveted, and do not depend upon solder. The "Hydrotherm," a new pattern circulator, is also being exhibited for the first time. This is capable of standing a heavy pressure, and will work equally satisfactorily whether fed from a tank with a 10 feet head, or under heavy town water pressure. It likewise is said to be remarkably efficient. The outer casing can be readily removed, without disconnecting the gas or water connections. There is a small selection of gas-fires and cookers displayed at the stand.

Petrol air-gas plants are once more considerably in evidence; the plants noticed being those of Petrolite, Limited, of High Holborn, the British and Colonial Lighting Company, Limited, of Tottenham Court Road, Messrs. Strode and Co., of St. Paul's Churchyard, Messrs. Spencers, Limited, of South Molton Street, W., the Litz Safety Gas Company, of Great Malvern, Messrs. Tredegar and Co., of Victoria Street, S.W., the Eos Petrol Gas Plant, of Cromwell Road, Kensington, and the Praed Patent Safety Gaslight Company, Limited, of Sutton. The Allen Company, of Victoria Street, S.W., exhibit acetylene plants; and the British Petroleum Company, Limited, of Fenchurch Street, spirit for use in connection with air-gas plants.

The other sections, though, as has already been remarked, of great interest to the general visitor, do not contain anything that calls specially for notice in the "JOURNAL" columns.

SOME LABOUR STATISTICS.

EVEN a few months later than its immediate predecessor—belated as that was—is the Thirteenth Abstract of Labour Statistics of the United Kingdom, which deals generally with a period not later than the end of 1908, and has only recently been issued by the Labour Department of the Board of Trade. Of course, in the case of some of the figures given, this is not their first appearance, as they have already been published in sectional volumes, which have duly been noticed at the time of issue; but this remark does not by any means dispose of the whole of the information contained in the present volume.

One item that may first be noted, because it deals with a later date than most of the statistics, is the standard rates of wages and weekly hours of labour recognized last October Passing over the building trades, we come to the engineering and shipbuilding branch, which is divided up into sections of pattern makers, ironfounders, engineers, boiler makers and iron and steel shipbuilders, brass moulders and finishers, and shipwrights. With regard to engineers, in the London district the rate of pay per week for turners, fitters, and smiths is given as 40s., of pattern makers 44s. and 45s., of ironfounders 41s. to 43s. In the marine shops at Cardiff, turners, fitters, and smiths get 41s. per week; whereas at Ipswich the wages for a 50 and 54 hour week are put down at 28s. In the majority of cases, the figures appear to be between 35s. and 38s.; and it is remarked at the head of the table that the rates given are those recognized for a full week's work, exclusive of overtime, by the principal Trade Unions concerned, according to the latest information in the possession of the Department.

With reference to profit-sharing schemes, there were 49 known to be in operation in the United Kingdom at June 30, 1908. Of these, one was in the building trade, one in the metal trade, five in engineering and shipbuilding, four in the textile trade, two in the clothing trade, one in agriculture, six in the printing and allied trades, three in the chemical, glass, pottery, and similar trades, five in food and tobacco, seven in gas-works and tar distilling, and fourteen in other businesses. The total number of schemes was two less than in the previous year; but a column setting forth the businesses "in which profit-sharing having been instituted no longer exists," totals no less than 146 cases, while there are three more as to which particulars could not be obtained. The reasons for the cessation of these schemes are various. Going right back to the year 1829 (when one scheme was started), the total of 146 cessations has been caused as follows: Death of employer 2; job finished, 2; enterprise abandoned, 4; liquidation or dissolution, 21; changes in, or transfer of, business, 17; losses or want of success, 21; diminution of profits, 7; apathy of employees, 11; dissatisfaction of employees, and grant of increased wages, 3; disputes with employees, 3; dissatisfaction of employers with results, 38; grant of shorter hours, 2; substitution of fixed rate of interest, 1; special circumstances, 6; causes not known, 8. The ratio of the bonus allotted to wages varied from 1 to over 25 per cent.; but taking 36 cases in 1907, the average bonus was 7·1 per cent. on the wages of the participants. The number of persons working under the 49 schemes which were known to exist at June 30, 1908, was 63,403, as compared with 45,010 twelve months before.

Among the accidents reported under the Factory and Workshops Acts in 1908, there appear under "Gas" the following statistics: Fatal accidents caused by machinery moved by mechanical power, 3; non-fatal, 146. Hot liquid, molten metal, &c., in vat or pan, fatal, none; non-fatal, 76. Explosion, fatal, 3; non-fatal, 40. Escapes of gas, steam, or metal, fatal, 1; non-fatal, 85. Other causes, fatal, 10; non-fatal, 2. This made a total of 17 fatal, and 349 non-fatal accidents.

At the end of 1907, there were 1173 Trade Unions, with a total membership of 2,406,746, as compared with 1287 in 1898, with a membership roll of 1,688,531. The 100 principal Unions in 1907 had a membership of 1,457,856, and an income of £2,493,282, or 34s. 2½d. per member. The expenditure was £2,054,157, or 28s. 2½d. per member; and the total funds at the end of the year amounted to £5,637,661, or 77s. 4d. per member. The National Union of Gas Workers and General Labourers of Great Britain and Ireland had a membership of 43,474 in 1898; and this figure rose to 48,030 in the following year. Then a decline set in, which reached its climax in 1905, when there were only 28,120 members. Latterly there has been a substantial improvement in this respect; the membership in 1906 being 33,680, and in 1907, 39,805. Whereas, however, the income of the Union in 1898 was only £16,702, in 1907 it was £22,686—with fewer members. The expenditure in the latter year was £20,349; and at the end of that year the funds in hand totalled £6794.

In 1907, there were 2177 workmen's co-operative societies which made returns; the membership being 2,439,603, or 5·5 per cent. of the population of the United Kingdom, as compared with 5·3 per cent. the year previous. The share capital was £31,948,150, and the loan capital £10,148,826; while the amount of sales and transfers is given as £123,350,464. The number of certified workmen's compensation schemes in operation in 1908 was 32; the workmen employed being 67,508, and the number contracting out of the Acts 65,277. The contributions by workmen amounted to £14,843, and those of the employers to £32,730. The payments to members and expenses totalled £43,722; and the funds at the end of the twelve months were £65,285. Among fourteen schemes in 1908, the estimated maximum amount payable under the Workmen's Compensation Acts for incapacity was £5438, while the amount actually paid under this head was £6244.

The federation of the towns in the Potteries, which has been a matter of keen discussion in the Midlands for many years past, took effect at the end of last month. On the 31st ult., the county borough of Hanley, the boroughs of Stoke-upon-Trent, Burslem, and Longton, the urban district of Tunstall, and part of the urban district of Fenton, all became fused in one great municipal area, to be known in future as the County Borough of Stoke-on-Trent. The borough is one of the twenty largest towns in the United Kingdom. It has a population of about 250,000, a rateable value of more than £790,000, and an area of nearly 10,000 acres.

It sometimes happens that the bottom of a lead-lined cistern becomes "pitted" after a period of use. When this is noticed, the corrosion may be checked by several methods. One is to treat the surface with a mixture of resin and tallow, the resin therein being somewhat in excess of the tallow, which otherwise might have a tendency to decompose and pollute the water. Bitumen applied hot is also good; but gas tar must not be mixed with it. A third suggested remedy is a coating of limewash, made from caustic lime, applied when warm, and allowed to dry before filling the cistern with water. This treatment, however, requires yearly renewal, or it may be done as often as the cistern is cleaned out.

The "Indian Daily News" (Calcutta) of the 17th ult. contained the following paragraph from a correspondent, Jogendra Nath Sinh: "I take the opportunity of thanking Mr. J. C. Watson, the Manager of the Gas Company and Chairman of the Maniktala Municipality, for rendering personal assistance in extinguishing the fire which broke out on Monday last at Belighata, the report of which has been published in your issue. No sooner had the flames drawn his attention, than Mr. Watson motored down to the spot, leaving his work. He rushed through the fire several times with a view to save the lives and property of those poor men who have now become homeless. In fact, Mr. Watson gave much help to the poor with his own labour. As this self-sacrificing act should not go unnoticed, I hope you will kindly give publicity to this incident."

SOME THEORIES OF COMBUSTION IN GASES.

Extracts from an Address to the Manchester Junior Gas Association by Professor Harold B. Dixon, M.A., F.R.S.

When members of the Manchester District Junior Gas Association were at the Victoria University of Manchester on the 12th ult., Professor Harold B. Dixon, M.A., F.R.S., delivered an address on "Some Theories of Combustion in Gases."

Dealing first with the union of hydrogen and oxygen in flame, Professor Dixon gave the results of his experiments at high temperatures, and with the aid of slides on the screen made this part of his address particularly interesting. He first studied the union of the two gases named as part of the investigation on the mode of burning carbon monoxide. When steam, either present to start with or formed in the flame, was found to be necessary for the propagation of a flame in carbon monoxide oxygen mixtures, he ventured on his first hypothesis—he thought a moderate one. If there was some constitutional disability preventing oxygen from direct combination with carbon monoxide, might not the latter take oxygen from steam, and the hydrogen so liberated re-form steam by direct union with oxygen? Many hypotheses had been advanced to account for the disability preventing the oxygen burning the monoxide directly—one that the oxygen, *per se*, was too stable, or that gases only reacted in equal volumes. He had shown, however, that neither the stability of the oxygen nor the "law of equal molecules" could be the cause, for carbon monoxide would not explode with ozone, with chlorine monoxide, or with nitrous oxide. On the other hand, the dried gases united readily without inflaming in the presence of red-hot platinum, and in the burning of dried cyanogen the carbon monoxide first formed would burn in excess of oxygen—either prolonging the flame, as in explosions, or burning with a separate flame, as in Smithell's flame-separator. Steam, therefore, was necessary for the burning of carbon monoxide only under certain conditions. How did it act? Carbon monoxide was found to take oxygen from steam and liberate the hydrogen when the two were heated together in a variety of ways.

In explosion of mixtures of carbon monoxide, oxygen, and steam, in which the oxygen was insufficient for complete combustion, the steam was found to give up its oxygen to burn the excess of monoxide. Moreover, the propagation of the flame through the mixture was found to increase in velocity the more steam was added up to 46 per cent. of the mixture. It was therefore possible for the carbon monoxide to take oxygen from steam in a flame; and if the liberated hydrogen united directly with oxygen, water would be re-formed, and the whole operation be completed by the repetition of some simple cycle. The next point was: Did hydrogen unite directly with oxygen in a flame, or did it only do so through the decomposition of, or by the intervention of, water?

The Professor went on to say that, in his experiments on the union of hydrogen and oxygen at high temperatures, he found that an electric spark which would fire a damp mixture of the two gases would also fire a similar mixture, however carefully dried. Many different electrodes were tried, and they were submitted to every process he could devise to prevent the possibility of steam being formed in or on the surface of the electrodes. The spark always determined explosion. Dr. Brereton Baker, a careful and patient experimenter, had come to the same conclusion. But it might be objected that "some steam molecule may exist in the path of the spark and start the reaction; and once started, the water formed serves to spread the flame." They could not, of course, prove that no steam molecules existed in the dried gas—indeed, he should say it was very probable that there were some. But they had some evidence as to the progress of the reaction in the explosion of hydrogen and oxygen; and this evidence they could use to test the point whether the flame, once started, was propagated by direct union of hydrogen and oxygen molecules, or whether the union only took place through the intervention of a steam molecule. Both Moritz Traube and Professor Armstrong had put forward the view, on different grounds, that for the formation of steam there must be a simultaneous reaction between three molecules—

$$H_2 + OH_2 + O_2.$$

Now, the explosion-wave was a true physico-chemical constant. According to Berthelot, the "wave" was propagated from layer to layer by successive shocks between the molecules, resulting in chemical action, so that the explosion-wave differed from the sound-wave in that the former varied, not only with the physical, but with the chemical, nature of the gaseous mixture.

Berthelot said that the maximum velocity of the explosion-wave could be predicted by calculating the mean velocity of the gaseous products before they had lost by conduction or radiation any of the heat of the chemical change. His (Professor Dixon's) own work on the explosion-wave began in an attempt to confirm or disprove his hypothesis that steam was the "carrier" of oxygen in the explosion of carbon monoxide and oxygen. The results obtained led him to use the explosion-wave as a means of tracing the course of other changes in gases. For example, it was found most useful in showing that the carbon in gaseous compounds of carbon was not burnt directly to carbon dioxide in explosions, but, in every instance that could be traced, the carbon dioxide, appearing as an end-product, had been produced by a secondary and not a primary reaction in the wave-front. After numerous experiments on the diluting effect of various gases on the propagation of the explosion-wave, he was led to advance a working hypothesis somewhat different from that of Berthelot. In his hypothesis, the gases were not burnt "cold," but the unburnt molecules were heated in the wave-front by "shock," and so were burnt "hot;" and, consequently, the product was raised to a higher temperature. A formula based on this hypothesis was successful in predicting the velocities of the explosion-wave in a number of different gases:—

Gas Mixture.	Velocity of Explosion Wave. Calculated.	Found.
$8H_2 + O_2$	3554	3535
$H_2 + 3O_2$	1740	1712
$2H + C_2$	1832	1849
$C_2N_2 + O_2$	2725	2728
$C_2N_2 + O_2 + 2N_2$	2166	2163
$C_2H_4 + 2O_2 + 8N_2$	1727	1734

He (Professor Dixon) found it very hard to believe that these extremely close approximations could be mere coincidences. There were probably many cases where the reactions were not so simple as the above. He found that the explosion-wave in a mixture of equal volumes of ethane and oxygen did not give the same products as were obtained in the explosion of ethylene, or of acetylene, with its own volume of oxygen. The ethane was not burnt wholly to carbon monoxide and hydrogen, but appeared to form—as Professor Bone had shown at lower temperatures—acetaldehyde and steam; the acetaldehyde yielding methane and carbon monoxide. For other gaseous mixtures, especially those in which steam was formed at a very high temperature, the formula gave a higher value than the rate found. For instance, the found velocity of the explosion-wave in electrolytic gas was a long way below that given by the formula. He explained this by the further supposition that the dissociation of steam was appreciable in the explosion-wave of electrolytic gas. In support of this view, the Professor showed by experiments that about 1 per cent. of unburnt gas remained behind after the explosion-wave had gone by, and proved that this could not be attributed to the cooling effect of the walls. He added that he did not believe to-day in the truth of his working hypothesis of the explosion-wave. It embodied a number of assumptions, some of which he had himself shown to be erroneous. Still, he thought it sufficiently parallel to the truth to be useful. He made no higher claim for it.

Summing up this part of his address, Professor Dixon said he believed the reaction between hydrogen and oxygen in an explosion was a direct one, and did not take place through the intervention of steam; and for these three reasons: (1) That well-dried mixtures of electrolytic gas always explode with a spark; (2) that the velocity of explosion in a well-dried mixture is greater than when steam is added; and (3), that the explosion-wave is propagated as a pressure-wave through the gas. Whether steam or water facilitated the slow combustion of hydrogen and oxygen below the inflammation temperature was another question. The most careful experiments made to decide this question were those of Mr. Brereton Baker. In the year 1902, Mr. Baker demonstrated that when the greatest care had been taken to purify the gases, the moist gases exploded when the tube containing them was heated in a flame, while the dried gases did not. In some of the tubes which did not explode, a small quantity of steam had been formed and in one tube, which had been dried for two days only, water was visibly produced by slow combustion. In another experiment, Mr. Baker heated a fine silver coil in the dried gases, and succeeded in melting it without exploding the mixture. Although he (Professor Dixon) agreed with Mr. Baker that steam (or water) intervened in the initial action of hydrogen on oxygen at moderate temperatures, he did not think it necessary for the propagation of a flame once started in the mixture. There were many similar differences in gaseous reactions. Light would not explode dried hydrogen and chlorine—it did so in the presence of water; but once start a flame in mixed hydrogen and chlorine, and it was propagated as an explosion-wave through the dried gases. A platinum wire heated to whiteness would not fire a mixture of cyanogen and oxygen—flameless combination taking place round the wire. But a spark immediately set up the explosion-wave in the same mixture.

The latter portion of the address was directed to the question "What is the first product of the union of hydrogen and oxygen in flame?" Did hydrogen and oxygen directly form steam, or did they form hydrogen peroxide in a flame? If they accepted the view of Mendeléeff that all primary reactions between different substances were bimolecular—a view enforced by Sir J. Larmor for gaseous reactions—they must suppose that a collision between a hydrogen and an oxygen molecule could only result in the primary formation of hydrogen peroxide, or in the formation of steam and a free oxygen atom. The following reasons had, among others, been brought forward for the view that hydrogen peroxide was the first product in flame: (1) That hydrogen peroxide is found in the water rapidly condensed from a hydrogen flame; (2) that the mixture of equal volumes is more sensitive to a spark; (3) that the mixture in equal volumes has a lower ignition point than any other mixture. Moritz Traube first showed, he thought, that a jet of burning hydrogen playing on to the surface produced peroxide in the water. Some years ago, when he repeated Traube's experiment, he thought that the mere heating of the water would produce some peroxide; but he found afterwards this was incorrect. It required some burning to take place near the surface of the water. But the presence of the peroxide

in the condensed water might be explained either by its direct formation from hydrogen and oxygen, or by the union of the liberated oxygen atom with a molecule of water. Those who favoured the first view considered the peroxide to be H – O – O – H; those who took the second view, considered the peroxide to be oxygenated water, $\begin{matrix} H \\ | \\ O = O \\ \| \\ H \end{matrix}$. The latter formula seemed to him to be supported by the remarkable researches of Carl Harries on the decomposition of ozonides by water, in which he showed that the loosely joined oxygen atoms attached themselves to water molecules to produce hydrogen peroxides quantitatively.

Engler's experiment of burning a hydrogen jet so as to bore a hole into ice, showed plenty of peroxide in the condensed water in the hole. He (Professor Dixon) had repeated this experiment, both with ice and with a lump of solid carbon dioxide. When a large jet of hydrogen was used, burnt with an outside blast of air, and a very small jet of nitrous oxide was introduced into the centre of the hydrogen flame, a piece of ice might be introduced so that it was surrounded by hydrogen, and a hole might be bored in it by the small central jet of nitrous oxide burning in hydrogen. The central jet might then be fed by oxygen, and the samples of condensed water compared. While the oxygen produced plenty of peroxide, only a trace was found in the water condensed from the nitrous oxide flame. This, of course, only showed that in the burning of hydrogen and nitrous oxide, steam was formed directly without the splitting off of an oxygen atom. In the explosion-wave, the greatest velocity of propagation was not given by electrolytic gas. The addition of hydrogen increased the velocity of the wave so long as it was set up in the mixture. This, of course, was due to the mobility of the hydrogen. But the fact that the addition of equal volumes of oxygen and nitrogen to electrolytic gas retarded the wave exactly in proportion to their density, was an argument that hydrogen peroxide was not the primary product of the change; for the two gases appeared to be equally inert to the mixture $2H_2 + O_2 - 1$. Let them consider the explosion wave traversing the mixture $H_2 + O_2$. If hydrogen peroxide were directly formed, the immensely high temperature of the flame and the very rapid cooling behind the flame should be precisely the conditions most favourable for a high yield of the endothermic peroxide. He had examined the product of combustion of the explosion-wave in such mixture, and could detect no peroxide. On the other hand, when the explosion-wave traversed electrolytic gas, about 1 per cent. of unburnt gas was left behind, showing how rapid was the cooling.

The experiments of Emich on the sensibility to explosion by small sparks of different mixtures of hydrogen and oxygen led him in 1897 to suggest that hydrogen peroxide was the first product of the reaction, on the ground that the mixture in equal volumes was most sensitive to the spark. In a later paper (1900) Emich withdrew this conclusion, although his work was still quoted as an argument in favour of the direct formation of peroxide. Whether or not a local heating of a small mass of gas by a spark would set up general inflammation must depend *inter alia* on the rate at which heat was conveyed away from the heated region; a gas richer in the rapidly moving hydrogen molecules would convey heat away more quickly than one poorer in hydrogen. Dr. Coward had recently found that the mixture in equal volumes was not the most sensitive to a spark. The addition of oxygen still further increased the sensibility. But a stronger argument had been drawn by K. G. Falk from his experiments on the ignition point of gaseous mixtures, heated by adiabatic compression. Acting on the very ingenious suggestion of Professor Nernst, he had compressed different mixtures of hydrogen and oxygen in a steel cylinder by means of a weight falling on a piston, and had determined the volume of the compressed gas by measuring the lowest point reached by the piston. Falk thought the mass of the gas was heated equally throughout until it reached the ignition point, and then that the whole detonated practically instantaneously, and the explosion stopped the descent of the piston. Assuming that the piston has no time to move downwards appreciably after the ignition point was reached, Falk calculated the temperatures of ignition of different mixtures:—

Mixture.	Ignition Point.
$4H_2 + O_2$	603°
$2H_2 + O_2$	540°
$H_2 + O_2$	514°
$H_2 + 2O_2$	530°
$H_2 + 4O_2$	571°

Falk said: "The fact that the maximum affinity is shown by the mixture $H_2 + O_2$ proves that H_2O_2 must be the first product of the reaction between hydrogen and oxygen." His reason for assuming that the gas detonated instantaneously throughout its whole mass, once the ignition temperature was reached, was the fact that the explosions were of great violence, and that the compression is very nearly the same in the case of electrolytic gas whether the weight fell from a lower or a higher altitude. What he found to be nearly true of the rapidly firing mixtures $2H_2 + O_2$ and $H_2 + O_2$, he had assumed to be also true of the less-rapidly firing mixtures with excess of oxygen, and the mixtures of hydrogen and air. When he (Professor Dixon) first read Falk's paper, it occurred to him that the descending piston must send in front its sound waves, which would be reflected from the bottom of the cylinder and back to the piston front, and so on, producing by their collisions *loci* of higher temperature, at one of which the flame would eventually start.

Falk stated in his second paper that Professor Jouguet had made the same criticism. By photographing the explosion produced by the adiabatic compression on a rapidly-moving film, he (Professor Dixon) had been able to show that the flame did start from a point; and in the more slowly burning mixtures, the spread of the flame throughout the gas took an appreciable time. Moreover, the point of ignition could be made to vary by altering the velocity of the piston. With electrolytic gas, the photographs showed that the explosion-wave was very quickly set up; but the flame always started from the one point. The mass of the gas was not fired instantaneously, although the time required in this case for the flame to reach the piston was negligible. With such a mixture as $H_2 + 2O_2$, the time required to set up the explosion-wave was not negligible. To determine the temperature of ignition of mixtures of hydrogen and oxygen, it was necessary to stop the descent of the piston artificially the moment the gases were brought to the self-heating temperature. This was effected by leaving on the end of the piston a steel head, which was caught by a steel collar at a certain point in its descent. By varying the thickness of the collar, the piston could be stopped at any point. By a series of trials a compression was found which fired the mixture, and a slightly less compression which did not. The mean between the two was taken as the ignition point. By repeating each experiment, nearly concordant ignition points were obtained. His ignition point for electrolytic gas agreed closely with that found by Falk—an agreement which showed that this mixture must have a very short period of flameless combustion, and that the spread of the flame must be very rapid. He found that the mixture in equal volumes had a lower ignition point than electrolytic gas; but it was not the mixture of "maximum affinity." The further addition of oxygen lowered the ignition point. He submitted therefore that the ignition point of hydrogen and oxygen mixtures did not support the argument that hydrogen peroxide was the first product of the reaction.

Daylight Efficiency of Artificial Illuminants.

The "Electrician" recently published an abstract of an article by Mr. Herbert E. Ives, upon the "Daylight Efficiency of Artificial Illuminants." In this (to use our contemporary's summary of the contents of the article) the author describes two methods of obtaining "a measure of the approach in colour to daylight of any illuminant. Two expressions are obtained for stating the colour efficiency—one by consideration of the white light available by the use of absorbing screens; the second, by consideration of the amount of white light which, with a spectrum colour, would match the light in question. The first is termed white light efficiency; the second white sensation efficiency." The author himself in his opening paragraph points out that among students of illumination, it is generally agreed that the best light for human use is daylight. This being so, it is interesting to see from the following figures that, by the methods adopted in the investigation, Mr. Ives finds that the incandescent gas mantle is, among the ordinary illuminants, at the top of the tree in both white sensation efficiency and white light efficiency, taking average daylight as 100.

	White Sensation, Per Cent.	White Sensation Efficiency.	White Light Efficiency
Glow lamp (4·85 watts per candle power)	13·7	31·0	19·3
Glow lamp (3·75 watts per candle power)	14·5	33·4	21·2
Glow lamp metallized (3·1 watts per candle power)	15·3	35·8	24·6
Tantalum lamp (2·6 watts per candle power)	15·9	37·3	26·3
Tungsten lamp (1·56 watts per candle power)	18·0	48·5	33·2
Acetylene	20·7	51·7	42·0
Welsbach mantle (¾ per cent. cerium)	24·5	66·5	50·5
Mercury arc	18·0	78·8	0
Average daylight	33·3	100	100

It is pointed out that the white light efficiency furnishes information, in the consideration of artificial illuminants, in respect of the merits of a source for the purpose of illuminating coloured objects. Of course, the larger the amount of available white, the better suited is the light to colour discrimination. Thus the incandescent gas-light is the most suitable, *plus* a lower whip-lash efficiency, of which so much was heard at the February meeting of the Illuminating Engineering Society.

Butterworths' Workmen's Compensation Cases.—We have received from Messrs. Butterworth and Co. Part I. (1910) of their Quarterly Advance Sheets of cases under the Workmen's Compensation Act, edited by Mr. Douglas Knocker. It is the first section of a series of reports dealing with every case entered in the lists of the House of Lords and the Court of Appeal; and further parts will be issued as soon as possible after the Court has finished the hearing of each term's list. At the end of the year, the cases will be published in volume form, together with the Scotch and Irish decisions, as Vol. III. of "Butterworth's Workmen's Compensation Cases," edited by His Honour Judge Ruegg, K.C., and Mr. Knocker.

HOLMES' DOUBLE-FACED VALVES

FOR **HIGH PRESSURE PLANT**

AS SUPPLIED TO—
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"V" TYPE.

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48 in. Diameter.

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IN STOCK.

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PERFECT RUBBER JOINT.
TRAVELLING and FIXED ELEVATORS.
FRICTION and HYDRAULIC HOISTS.

SUGG'S

"WESTMINSTER" GAS KITCHENER

EMBODIES

ALL THE LATEST IDEAS.

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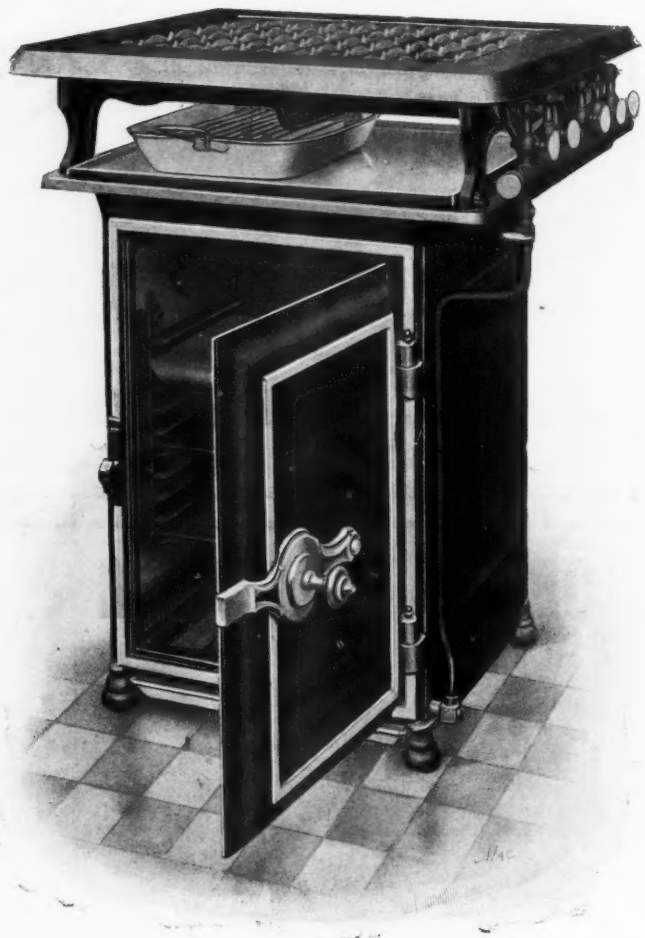

SPECIAL POINTS.

Large Hot Plate and Oven.

Removable Enamelled Tray under Hot Plate.

Quickest Grill.

Removable Burners.

Gas and Air Regulator to each Burner.

Reference Number.	Inside Oven. High.	Inside Oven. Wide	Inside Oven. Deep.	Dimensions over all. Hot Plate. Wide.	Dimensions over all. Hot Plate. Deep.	Total Height.	Number of Grill and Boiling Burners.
5139	1 ft. 10½ ins.	1 ft. 0 ins.	0 ft. 11½ ins.	1 ft. 10 ins.	1 ft. 9 ins.	2 ft. 6½ ins.	4
5140	1 „ 10½ „	1 „ 1½ „	1 „ 1½ „	1 „ 10 „	1 „ 9 „	2 „ 6½ „	4
5141	1 „ 10½ „	1 „ 1½ „	1 „ 1½ „	2 „ 1 „	1 „ 11 „	2 „ 7 „	5
5142	1 „ 11½ „	1 „ 4½ „	1 „ 5½ „	2 „ 1 „	1 „ 11 „	2 „ 7 „	5
5143	1 „ 11½ „	1 „ 4½ „	1 „ 5½ „	2 „ 5 „	2 „ 1¾ „	2 „ 8¾ „	6

The Cheapest Kitchener to Maintain and Easiest to Clean.

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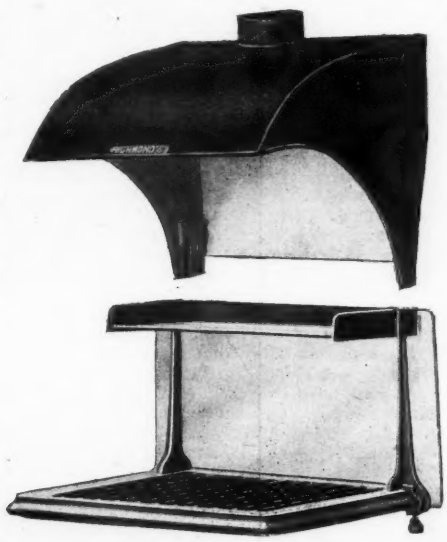
NOVELTY AND UTILITY IN COOKERS.

In these days there is an all too common tendency to cut to a low point the price paid for gas-cookers; but there is much that is fallacious from the economic point of view about too close an adherence to this policy. The desire to purchase what is called "cheap" has a peculiar way of growing on one when once encouraged; and, with the growth, one becomes gradually blind to the virtues of a higher grade and somewhat more costly class of goods. This applies to gas-cookers as to other manufactured articles. Looking at the matter from the financial point of view, capital saving does not form the sum-total of consideration; for no one will contest the point that a good cooker gives the best value in the matter of wear and tear, maintenance, and renewal costs. Where compensation for present outlay is obtained from future savings, there one has real economy. And there is the further consideration that a really good article, or rather (in this instance) a really good cooker, is bound to give the user greater satisfaction than one that, pleasing in appearance it may be, is inferior both in respect of constructional and serviceable details. The point is worth thinking over on the part of those whose aim has of late years been to obtain as many cookers as possible for a given expenditure, regardless of a high standard of merit.

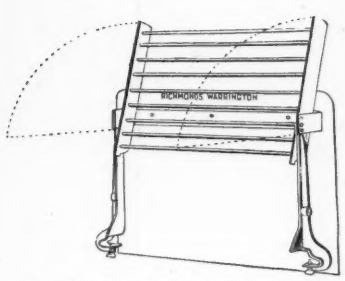
These prefatory thoughts arise in considering some new and useful features that have been added to the attractions of the "Crusader" type of cooker of the Richmond Gas Stove and Meter Company, Limited. The Company, it is evident, have had in view, for the cooker season now being entered upon, a dual object in effecting the improvements. In the first place, they have endeavoured, and the endeavour has been rewarded with success, to bring the cooker up to a high state of efficiency to meet the requirements of the suppliers of gas; and, in the second place, they have made a serious attempt, and again with success, to incorporate adjuncts contributing to the pleasure and the advantages of cooking by gas as compared with coal.

Considering first the features of the improved "Crusader" cooker from the gas suppliers' point of view. When this type of cooker was introduced now several years ago, it led the way in having no screws on the enamelled surface, either inside the oven or on the crown-plate; so that wherever grease fell there was no accommodation provided for its lodgment, and there were no screws to prevent a clean "rub-down" after using the oven. All the advantages then introduced have been retained in the cooker; and the chief improvement now effected, which will be pronounced as both a convenience and a saving to gas suppliers, has reference to the hot-plate. The vogue of the builder of houses nowadays is to provide kitchens of extremely, and uncomfortable, limited area; and it somewhat frequently now occurs that there is not in such kitchens room for gas-cookers with the taps at the side. To meet the difficulty, there has had to be a special ordering of cookers with the tap-rail in front. This has meant, where stock patterns have not been suitable, some delay in securing what is required. It occurred to the Richmond Company that, if a cooker could be made that, without special ordering, could be readily adapted for any position, it would be a distinct advance in the matter of convenience, and helpful in the economizing of the time and expenses of the gas-distribution department. The idea was materialized in an ingenious and practical way. Simply by the removal of the union at the side connection, and the loosening of four screws which secure the hot-plate to the bridges, the whole of the top can be turned round by the gas-fitter himself, so as to convert the cooker from side tap to front tap. The change can be effected within five minutes. A *desideratum* is here satisfied. The hot-plate is made square; so that, with the taps either at the side or in front, the hot-plate has the same depth and width. The top burners when the taps are at the side run from right to left; when the taps are at the front, the burners run from back to front. But their arrangement is excellent in both these cases, so that there is no disadvantage whatever in the position of the burners. In one of the illustrations, the fitter is portrayed turning the hot-plate to meet the requirements of the situation; and in the largest of the illustrations, the cooker is seen with the tap-rail in front. In addition, a new type of door has been provided for this class of cooker. In design, as the illustration shows, it is both massive and artistic. When one considers these improvements and the prior ones, it must be conceded that it is difficult to put the finger upon any point where further advances can be made so as to produce any additional reduction of fixing and maintenance costs.



The Removable Hood.

Turning the Hot-Plate to Bring the Tap-Rail to the Front Tap.



Movable Plate-Rack, when out of use.

Cooker, Showing Plate-Rack and Hood Complete.

Such improvements are advantageous not only to the gas supplier, but to the user of the cooker. In addition, the Richmond Company are this season introducing a combination plate-rack, removable back, and hood, which combination can be fixed to the cookers of any maker complete, or the plate-rack alone without the hood. Cheap though the combination is (we do not generally mention prices in these notices, but the cost is so reasonable that an exception is made by saying that it runs, according to size, from £1 net), it adds so considerably to the appearance of the cooker—making it much more imposing—that one feels inclined to put upon it a much greater value than is represented by the extra cost; and from the points of view of utility, cleanliness, and

appearance, it is bound to commend itself to the housewife. Plate-racks and hoods to cookers are not new. This particular combination (for which a patent has been applied for) is new in respect of its means for fixing, universal applicability to old and new stoves, and the design that gives it universality, movability, and portability. But to a few details. The plate-rack has two side supports, the bases of which are made to clip on to the cornices of the crown-plate of the cooker, and with a thumb-screw underneath are held rigidly in position. The rack (which is made of wrought steel) is a movable one; and when in position is held firmly by two projections on the side bars of the frame engaging with the back bar. When not in use, or, when from any cause, the rack (in the down position) would be in the way, it can be lifted and swung back so as not to be an inconvenience. The usefulness of the rack for plate warming, or for the accommodation of dishes when "dishing-up"—in fact, for several purposes while cooking is in progress—is apparent. The second feature in the combination is a loose enamelled back for the protection of the wall, and to prevent splashings from cooking on the hot-plate. A couple of studs on the back bar of the rack, and corresponding keyholes in the plate, enable the latter to be hung in position, and readily removed for cleaning.

The rack and back plate can be had separate from the hood; but the hood gives an air of completeness to the arrangement and is an extremely useful addition, particularly in the modern kitchens of limited cubical capacity. One difficulty in providing a fixed hood hitherto has been that the sides have been brought down to the cooker top; and this has been somewhat of an impediment. With this removable hood forming part of the combination, the difficulty has been overcome by making the hood to fix on to the plate-rack, and this gives complete freedom at the sides. Grooves are provided in the plate-rack into which the supports for the hood slide; and thus the hood is held rigidly in position. Provision is made for ventilation at the top of the hood. The whole combination and arrangement generally are as ingenious as they are attractive. We are of opinion that there is a good business to be done in this combination.

The Richmond Company have also added to the conveniences of their grillers. Grillers, though an extensive trade is done in them, have had little consideration paid them in the matter of location. They have found accommodation where they could; and in this respect they have generally been at the mercy of the whims and fancies of fitters and housewives. Their convenience claims for them more considerate treatment. The firm are now making substantial iron stands, with a barred under shelf between the four legs, and an enamelled top, which gives it a clean and good appearance. In addition, the new plate-rack and enamelled protecting back are now made for fitting to the grillers. The rack is convenient as a rest in using a griller, and a couple of plates can be warmed nicely on it.

The firm have in times past been successful in introducing structural and efficiency improvements in gas cookers and fires in many ways; and among them those noticed in this article, it will be conceded, are of considerable value in their recommending characteristics.

SCOTTISH JUNIOR GAS ASSOCIATION.

Visit to Falkirk Corporation Gas-Works.

A joint visit to the Falkirk Corporation Gas-Works was made by the Eastern and Western Divisions of the Scottish Junior Gas Association on Saturday afternoon; nearly forty members of the latter and about twenty of the former being present. The visitors were received by Provost Christie, Bailie Bogle (Convener of the Gas Committee), and Mr. W. Wilson (Engineer and Manager).

Attention was centred in the working of the charging and discharging machines of Messrs. R. Dempster and Sons, Limited, of Elland, which were shown in operation, and were explained by Mr. Wilson. A retort was charged in the short space of 30 seconds; and the discharge occupied about the same time. It was noted that the coke was of a beautifully clear appearance, and very even in size. Originally it was taken from the retort-bench by a hot-coke conveyor; but this plant has been superseded by a method of Mr. Wilson's designing. On the front of the bench, in the lower floor, hangs a pocket into which the coke falls when drawn. It is there quenched, and when cold the bottom of the pocket—a movable saucer worked by a lever—is withdrawn, and the coke falls into a truck. This is run out upon rails into the yard, and is elevated by an electrically worked hoist to a high-level platform, from which the contents are either tipped into the bing or into the screening plant. No other change has been made in the works since they were described in the "Journal," at the opening in 1904; but their equipment has been completed by the erection of a very handsome suite of offices, which contain, on the ground floor, apartments for the Manager and his Assistant, a spacious public office, a photometer-room, a drawing office, and a gas-stove room. On the flat above are the residences of the foreman and the timekeeper. In another block recently erected near the gate are a weigh-house, an engineering shop, a meter and stove repairing shop, and stores.

Having completed the inspection of the works, the visitors were entertained at tea in the exhauster and station-meter house—Provost Christie presiding.

At the conclusion of the repast,

Bailie Bogle, in the name of the Corporation, extended a very hearty welcome to the Association. They were aware, he said, that Mr. Rule, the President of the Eastern District, was lately in their service; and he was sure the Corporation were pleased to know that he had obtained a very good appointment. They wished him success in his new situation, and trusted he would ultimately get a position more worthy of his merits. The Corporation were quite willing to show their gas-works to any public body, as they believed they would see one of the most up-to-date works, not only in Scotland but in the United Kingdom. The Corporation had spared no expense in their erection. They put in the newest machinery, and, with one exception, it had worked very successfully during the whole six years the works had been open. He had the honour of presiding at the opening meeting, and he remembered saying that the time would come—possibly in the near future—when they would be able to supply gas almost for nothing. Even now, after the lapse of six years, he did not go back upon that statement. He was perfectly certain that if they adopted the methods they ought to adopt for dealing with residuals, and other matters which they had looked at without having taken advantage of—for instance, in dispensing with the use of lime for purification—they would effect so large a saving that they would be able to supply gas, not exactly for nothing, but very nearly so. He found that in the old gas-works labour, from coal-waggon to coke heap, including 9d. for carting, cost them 3s. 3d. per ton of coal. In the new works it cost them only 1s. 1d. per ton. The undertaking was saddled with a very heavy capital, amounting to £205,500, which was a tremendous handicap to them. Considering the distance they were from the coalfield, it was wonderful that they had been able to do what they had done. They were selling gas at 3s. per 1000 cubic feet; but there was a time when it was 4s. 9d. During the past three or four years, the town had not been progressing as it used to do, and the output of gas had gone back. It was about 200 million cubic feet last year; but if they had progressed as they were doing some years ago, it should have been 300 millions. Their works were capable of almost doubling the present output without any further plant being put down. The ground upon which they were built was an ancient morass; and shortly after their erection the retort-bench unfortunately sank for a considerable time. In doing this the bench was cracked in places; and their coke-conveyor did not work as it should have done. Ultimately, after a great deal of trouble, and a loss, he was sure, of £4000 or £5000, and an immense amount of extra labour, they dispensed with the conveyor, and reverted to the old-fashioned method of removing the coke by hand, combined with the electric hoist the visitors had seen. They now did the work considerably cheaper than with the conveyor. There was nothing wrong with the machine; the trouble arose from the sinking of the bench. This was the only important episode they had had since the works were started. He was certain they would now be carried on successfully.

Mr. D. Currie (Stirling), the President of the Western District, conveyed the thanks of the Association to the Corporation for their kindness in allowing the members to visit the works. Those of the Western District wished also to offer their congratulations to Mr. Rule upon his success, and express their hope that his appointment was only a stepping-stone to something better. The Corporation of Falkirk were to be congratulated on having such excellent gas-works, and so able an Engineer and Manager in charge of them.

Mr. H. Rule (Kelty) expressed the thanks of the Eastern District to the Corporation for allowing the visit, and also his own for the all too kind things which had been said of him during the afternoon.

Mr. T. Wilson (Coatbridge) pointed out that if they were in the same position in Falkirk as they were in Coatbridge, they would be selling gas for nearly nothing. The charge for interest alone in Falkirk was about 1s. per 1000 cubic feet more than in Coatbridge. But then there was a saving of 1s. 4d. per ton in the handling of coal there, as compared with Coatbridge; and this, on 22,000 tons a year, meant something considerable. He had instructions from his Board to recommend them some coke-handling plant. He had been all over England, and had not seen any to equal that which he had seen that day; and he was prepared to recommend the adoption of something like it. He proposed a vote of thanks to Provost Christie and Bailie Bogle for their kindness in receiving the visitors.

Provost Christie expressed the very great pleasure the Corporation had in knowing that the Association thought it worth their while to visit Falkirk. They were thoroughly satisfied with their works and their Manager.

Mr. Currie proposed a vote of thanks to the Engineer and Manager for the very kindly manner in which he had shown the members over the works.

Mr. Wilson, in acknowledging the vote, said that as one of the Past-Presidents of the Western District he had a very personal pleasure in welcoming the members. He was possibly the youngest gas engineer occupying a senior position in the gas world at the present time; and he thought this fact was largely attributable to the interest he took in the Junior Gas Association, which was the schooling ground for coming gas engineers. He thought this was borne out by the fact that almost all the gentlemen who had been Presidents of the Western District were now occupying senior positions.

The gathering then dispersed.

INFORMAL MEETING OF SCOTTISH GAS MANAGERS.

Annual Meeting in Glasgow.

The Twenty-Seventh Annual "Informal Meeting" of Scottish Gas Managers was held in the Windsor Hotel, St. Vincent Street, Glasgow, last Wednesday. In the notice convening the meeting, Mr. W. B. M'Lusky, of Perth, intimated that the meeting would be open to all gas managers, assistants, or members of junior gas associations; and that gas managers might introduce visitors to the meeting, on application to the Convener—visitors to include persons engaged in the administration of gas undertakings, and principals or managers of engineering or other concerns connected with the gas industry. These conditions are in conformity with the rules and regulations of the North British Association of Gas Managers, which were adopted at Stirling last July. Owing to the failure to take the chair of Mr. J. Ballantyne, of Hamilton, who was nominated at last year's meeting, Mr. D. Vass, of Airdrie, again presided. When the chair was taken, shortly after 2 o'clock, there was a very good attendance; the gathering being almost entirely composed of gas managers.

The Convener said he was sure it was a disappointment to them that Mr. Ballantyne did not see his way to take the chair. In the circumstances, he had no alternative but to ask Mr. Vass to continue in office; and he hoped they would approve of this course. It would have been unreasonable to have asked Mr. Vass to deliver an address, after the one which he gave last year; but he very kindly agreed to take part in the proceedings. They would see, from the programme, that Mr. Wilson, of Glasgow, Mr. Herring, of Edinburgh, and Mr. Yuill, of Dundee, had come forward, at very short notice, to help to interest the members in some of the more important matters engaging the attention of gas managers.

The William Young Memorial.

The President said they had intimations from Mr. Wilson and Mr. Herring that they had been both called away in connection with the Glasgow Corporation Gas Bill, and this had, to some extent, depleted their audience. But they had very able substitutes in Councillor W. B. Smith, who would take up the subject Mr. Wilson was to have dealt with, and in Mr. A. Masterton, who was to fill Mr. Herring's place. Councillor Smith was Convener of the Glasgow Committee on Purer Air. They had all, as members of the North British Association, been approached recently in connection with a matter which was of great interest to the North British Association, and to all of them as individuals—the William Young Memorial. Circulars had been issued calling on the members to subscribe to the memorial. Most of them knew of the steps which had been taken with a view to doing something, in the shape of the publication of Mr. Young's works, as a memorial which would stand for all time. But they were aware that the financial question was the stumbling-block in this movement. They had now something before them which, he ventured to think, would exceed even the other proposal in usefulness. This was that every two years there should be a lecture by one well qualified to deal with his subject, before the meeting of the North British Association. It was in order to get up a fund sufficient to warrant them in carrying out this arrangement that an appeal was being made. He was sure they in the Informal Meeting, having so recently celebrated one prominent member of the profession, were all heartily in sympathy with the movement which had been brought forward on this occasion.

Mr. J. W. Napier (Alloa) remarked that, as most of them were aware, the Committee entrusted with the duty of raising a sufficient fund for this memorial had gone a certain length with their labours, and were at such a stage as would determine the ultimate success of the proposal. The memorial was one which must appeal to all gas managers. They had heard of the honour just conferred in England upon the memory of Sir George Livesey. They knew what gas companies and corporations and gas managers in England had been able to do to perpetuate the memory of that great man. Now, while in England they were able to speak of their hero, in Sir George Livesey, he thought that they, as Scotsmen, ought to make the utmost endeavour possible to perpetuate the memory of their hero—William Young. The memorial, as they were all aware, was fortunately to be neither of brass nor of marble, but was to be something of more living and real interest, and one which ought to appeal to all technical men. One of the objects in the conception of the Lectureship was that of creating a better status, as it were, for the North British Association—that they might look upon the proceedings of the Association as more valuable in the future than they had been. No doubt in the past the proceedings had been, in every respect, exceedingly valuable; but they hoped that the Lectureship would provide matter in their "Transactions" which would reflect the very best, in any capacity, existing among the prominent men in the profession. He would therefore appeal to every gas manager to do his utmost to forward the interest of the fund. It was at one time hoped it might be brought into practical shape at their meeting next July; and while this was somewhat improbable at the present moment, still he did not see why it should be impracticable.

The President said the remarks of Mr. Napier would be open for discussion. He purposed to take up each of the papers in turn; and then they would go into a discussion upon the whole of them together.

SMOKELESS FUEL.

Mr. W. B. Smith (a Town Councillor of Glasgow) read a paper on this subject.

He said: I much regret that Mr. Wilson could not attend this meeting; but I am glad to take his place, and to have this opportunity of opening a discussion on the subject that Mr. Wilson had chosen, if you will permit me, as one not versed in the technicalities of your work, to put before you some ideas that have come to me as a member of the Glasgow Gas Committee.

In the whole history of the gas-making industry, there never was a time when its prospects of usefulness to the community were so great as they are to-day. Gas, originally intended for lighting only, has become a necessity for cooking and heating in the house, and for many manufacturing processes in the workshop; and now that public feeling is so strongly roused to the necessity for a purer atmosphere as essential to the better health and longer life of the community, the scope of gas using is greatly enlarged. The pressing need for smokeless fuel demands that your energies be specially directed to two objects, which fortunately are not antagonistic to each other. In the first place, we shall want much larger quantities of gas at greatly reduced prices; and, secondly, we require, for many purposes, a better bye-product than the present form of coke—something that can be burned in ordinary grates. The increased price the public would be willing to pay for better coke should materially contribute to a reduced price for gas.

To enable the general public to realize the possibilities of gas, I hold that it is the duty of all gas undertakings, whether municipal or private, to help to popularize the use of gas by keeping themselves up-to-date, and by educating their consumers in the most modern ways of using gas. This conclusion has been forced on me by my experience in a West of Scotland town where I have been spending the winter. I find that there are very few gas-cookers in use there; and in no shop in the town did I see any display of them. Many of the houses built lately have no gas supply whatever; the lighting being electric. When I learnt on inquiry that they are still supplying gas of 24-candle power, costing 3s. 4d. per 1000 cubic feet, I did not wonder at it. It seems to me that they are afraid of offending the consumers, who, because they know no better, still use the old flat-flame burner. As you know, 24-candle power is far too high for incandescent burners. I examined the nozzles of two inverted incandescent burners that had been in use for only a few months; and I found them thickly coated with carbon, which had even deposited round the top edge of the mantles, and partly destroyed them. This occurred on burners where the gas was not turned on full, but was always carefully adjusted. Under such conditions, can one wonder at gas being supplanted by electricity?

Any gas undertaking that does not come into line with modern requirements by lowering the candle power to a point more suitable for use in cooking and heating appliances and incandescent lighting, is not fulfilling its duties to the public. Parliament recognizes the changed conditions; for the Model Clause for Gas Acts says 14-candle power, and something near that quality will best meet the demand for a smokeless fuel, and still be best for lighting. I have heard people who use incandescent gas lighting complain about "bad gas" or "poor gas;" and I have always found the trouble to arise from too good gas—gas so rich that it took more air to burn it than could practically be mixed with it, and so gave a flame that deposited soot on the mantle.

That gas is an ideal fuel in many respects has been very fully demonstrated by the results of the most exhaustive series of experiments made by our Corporation Chemical Department, and reported on to the Corporation by Mr. F. W. Harris, Chief Chemist, Mr. Peter Fyfe, Chief Sanitary Inspector, and Mr. Alex. Wilson, Gas Manager.* No doubt you have all read this report. The Corporation were so satisfied with it, and so recognized its importance, that we gave instructions to have it re-cast in popular and non-technical language, that the public may easily understand it. It proves conclusively that a gas-fire, of proper construction, properly fitted in, is quite as healthy as a coal-fire; that a gas-fire does not "dry the air" of a room quite so much as a coal-fire; that the temperature of the room can be kept at the same point, without fluctuation, for any length of time, making it almost invaluable in cases of sickness; that no fumes are given off into the air of the room; that the ventilation of the room is quite ample, and not so liable to cause draughts as with a coal-fire; that for cooking, and for heating rooms for a few hours at a time, gas is cheaper than coal, while for prolonged heating it is only about 25 per cent. dearer, without allowing anything for saving of labour; and that the products carried up the chimney and thrown into the air are not only smokeless, but innocuous.

* See "Journal," Vol. CIX., p. 39.

Unfortunately, there are gas-fires on the market that are not properly constructed; and they do not give all these good results. It is clearly our duty to condemn them, as they bring discredit on gas heating. That a user may be informed of the state of matters in his own house, I got a motion carried to instruct the Gas Committee to report on the advisability of appointing a staff to inspect gas fires and cookers in consumers' houses, when desired, and to certify if they fulfil the conditions necessary to health and efficiency. This has not come up for discussion yet; but I think the scheme is feasible. The Water Department test all fittings; and the Electricity Department will not connect to an installation until they have tested the insulation. The Gas Department might be authorized to make certain tests, not perhaps compulsorily, but where desired.

Many people to-day judge gas-fires by their experience of something tried—perhaps many years ago—that was unsatisfactory; and they condemn the whole system of heating by gas, when the fault was really with the particular appliance they used. But we must not continue to suffer for the faults of ignorant makers or fitters; and some scheme of inspection seems to me a way to counteract wrong impressions, and inspire confidence.

While advocating gas and coke as smokeless fuels, let me impress on you that your methods of production must be smokeless. Many gas-works are themselves smoke producers; and this must be stopped. Acts of Parliament for the prevention of smoke included gas-works among those liable for prosecution; and it will not do for us, as a health authority, to fine ourselves as a gas department for emitting smoke. As smoke is not only a danger to the health of the community, but a loss of money to the producer, you must find some way to stop it.

VALUATION AND INCOME-TAX.

This subject was introduced by Mr. A. YUILL (Dundee). He said: As to valuation and the mode of computing the same, it is better understood than formerly, though it will require a considerable amount of reasoning to convince one that it is computed on the basis of equity, when either the amount of capital or profits is considered, in comparison with other industrial concerns. The subject of income-tax assessment is of more importance to us at the present time; and I purpose confining myself principally to the consideration of this.

The latter part of last year, most of the members of the gas profession felt some degree of surprise on receiving a circular from the Income-Tax Commissioners, intimating a new form of computation to the following effect:—

DEPRECIATION OF GAS AND WATER UNDERTAKINGS.

1.—This scheme has received the approval of the Board and *the assent of the various Institutions which represent the corporations and the companies concerned*.

2.—No depreciation should be allowed in any circumstances in respect of any portion of these undertakings.

3.—All expenditure on repairs and renewals, but excluding extensions and improvements, is to be charged and allowed as working expenses, as and when incurred.

4.—Provided that, whenever any exceptional expenditure on *bonâ-fide* renewals is incurred, and full effect cannot be given to its deduction in that year, owing to the profits or gains chargeable with income-tax in that year being less than the amount so expended, the balance of the expenditure which has not been allowed may be carried forward and allowed the following year or years, as is provided in the case of unallowed wear and tear by section 26 (3) of the Finance Act, 1907.

5.—These proposals are to take effect for the year 1909-1910, and for years preceding in cases where claims of depreciation are at the present time awaiting settlement.

6.—Where in any case allowances for depreciation have been made which are now to be discontinued, and they have not been exhausted by renewals already effected, the amount of such unexhausted allowances should be determined by agreement between the Surveyor and the corporation or company, and deducted from the expenditure on future renewals as and when they are effected.

The first item, by way of introduction, mentions that it has received the approval of the Board, and the assent of the various Institutions which represent the corporations and the companies concerned. On making investigations on this point, I find that this, along with other matters, was considered some time ago by a self-elected body, terming themselves the "Municipal Accountants' Association," who no doubt may have read about the historical "Three Tailors of Tooley Street," and were influenced accordingly. I am somewhat surprised that the gas profession has not taken up this matter in a more serious spirit before now, and brought it to a satisfactory conclusion, the same as the Municipal Tramways Association have done. This would have saved to a great extent the trouble of tackling the subject with the local assessors individually.

With reference to the second item, we are confronted with the kernel of the situation. I have no desire to go into the question of procedure—why the assessable values are computed under Schedule D, instead of Schedule A. This was fully gone into and explained by Mr. W. A. Schultz, of No. 50, Cannon Street, London, acting under instructions of the Parliamentary Committee of the Gas Institution, who clearly pointed out that, under Schedule D—

The allowance of depreciation is made obligatory in the Customs and Inland Revenue Act, 1878 (39 & 40 Vic., cap. 16), Part 2, Taxes, Section 12, which provides:

Notwithstanding any provision to the contrary in any Act relating to income-tax, (*a*) the Commissioners for general or special purposes shall, in assessing the profits or gain of any trade, manufacture, adventure, or concern in the nature of trade, chargeable under Schedule D, (*b*) or the profits of any concern chargeable by reference to the rules of that schedule, (*c*) allow such deductions as they may think just and reasonable as representing the diminished value, by reason of wear and tear during the year, of any machinery or plant used for the purpose of the concern, and belonging to the person or company by whom the concern is carried on, &c.

The Finance Act of 1907 (7 Ed. VII., cap. 13), section 26, provides—

For the purpose of enabling deductions for wear and tear to be allowed by the additional Commissioners, claims in respect of those deductions shall be included in the annual statement required to be delivered under the Income-Tax Acts of the profits or gains of the concern for the purpose of which the machinery or plant is used, and the additional Commissioners, in assessing those profits and gains, shall make such allowances in respect of those claims as they think just and reasonable.

The two Acts above noted are those which govern the depreciation to be allowed, and which may be considered correlative to each other; and they clearly set forth that allowance must be made for diminished value during the year by reason of tear and wear.

We have another pronouncement on this point from the Chancellor of the Exchequer in May, 1907, in reply to a communication from the Association of the Chambers of Commerce of the United Kingdom, which is as under—

The Chancellor of the Exchequer has had under his consideration the memorial of the Association of Chambers of Commerce of the United Kingdom, which you sent him at the beginning of April. The chief points in the memorial are as follows:

1.—That the allowance in respect of repairs and depreciation of machinery is insufficient, and the methods of calculating such depreciation are unsatisfactory.

2.—That no allowance is made for the cost of replacing machinery which has become obsolete.

As to the first point, I am to say that, as the law now stands, deductions are allowed both in respect of expenditure incurred in repairs or alterations of machinery, according to an average of the three years preceding the year of assessment, and also in respect of the diminished value of machinery by reason of wear and tear during the year. The allowance of these deductions is in the hands of the District or Special Commissioners, as the case may be; and they have to decide in each case, as it arises, the adequacy of the deductions allowed, &c.

From the above, it will be noted that both expenditure on repairs and depreciation for wear and tear are allowed.

In considering the behest of the Commissioners that no depreciation will be allowed in any circumstance, one is confronted with the question, Wherein do gas and water undertakings differ from any other concern, as both gas and water works are owned by companies, and are carried on as a source of profit on the same lines as a mill or any other industrial undertaking? Suppose we take the case of tramway undertakings. I find that, in a case before me, they are allowed depreciation on the permanent way equal to 41·75 per cent. on the adjusted assessable value, 7 per cent. on the written-down value of cars and other rolling stock, and 5 per cent. on machinery, plant, workshop tools, and miscellaneous equipment. The net total deduction for depreciation for wear and tear equals 58·49 per cent., and the net assessable value 41·51 per cent. of the adjusted assessable value before deduction of depreciation. Compare this with the orders of the Income-Tax Commissioners, that they will not allow any depreciation in any circumstances for gas and water undertakings. I am at a loss to determine why these two departments are singled out and dealt with in such an arbitrary manner.

With reference to item 3, this states: "All expenditure on repairs and renewals, but excluding extensions and improvements, is to be charged and allowed as working expenses, as and when incurred." I am sure several of the members will be conscious of the fact that occasions may arise where machinery or plant in gas-works may be discarded through obsolescence. In accordance with this clause, that is not allowed.

Suppose we take a case to illustrate our meaning. A gas-works may have occasion to discard the method they have in use in the manipulation of their retorts, which necessitates the installing of new machinery, differing in every detail from that formerly in use. New capital has to be raised to meet the improvements, which, together with the sinking fund on same, will add to the net assessable value. But as this is in the nature of an improvement, no allowance will be made for depreciation or obsolescence of the old plant. This, in my opinion, is not in accordance with the Finance Acts, nor in accordance with the opinion expressed by the Chancellor of the Exchequer, as previously noted. A great many cases could be given of a similar nature in connection with gas-works, all proving the arbitrary nature of the clause.

Clause 4 of the circular is inoperative to some extent, so far as it affects gas companies or corporations. As I do not remember a case where exceptional expenditure on *bonâ-fide* renewals is incurred in any year in excess of the income, the balance of such loss may be carried to the debit of next year.

With reference to clause 6, when this is taken in conjunction with clauses 2 and 3 it has a certain amount of mystification about it—more especially when you consider clause 2, which states that no depreciation will be allowed, and clause 3, which enacts that such expense will only be allowed as working expense.

As this question is of importance to all gas companies and

Corporations throughout the United Kingdom, I am of opinion that the Council of the Gas Institution ought to take up the matter with the Income-Tax Commissioners at Somerset House. The question is too momentous to be dealt with individually.

VERTICAL RETORT CARBONIZATION.

Mr. A. MASTERTON (Assistant-Manager at Edinburgh) read the paper on this subject prepared by Mr. W. R. Herring, and given on pp. 109-11 of this issue of the "JOURNAL."

Mr. MASTERTON, at the close of the paper, said that in the current issue of the "JOURNAL OF GAS LIGHTING" there was a full description, with diagrams, of the setting which had been erected at Granton. They had not been able yet to charge the retorts, but expected to do so in a few days; and he had no doubt that the technical results would, in a short time, turn out very interesting indeed.

SURPLUS GAS REVENUE FOR THE RELIEF OF RATES, &c.

The PRESIDENT'S contribution consisted of a paper on the "Appropriation of Surplus Revenue of Gas Undertakings to the Relief of Rates and Other Purposes."

Many of the municipal gas undertakings in Scotland have been acquired by the local authority under the Burghs Gas Supply (Scotland) Act, 1876. Under section 41, the Act clearly sets forth the manner in which the revenue can be applied—*i.e.* (1) To meet the expenses incident to the manufacture and distribution, (2) for interest on borrowed money, (3) to provide a sinking fund, and (4) to provide a depreciation or renewal fund sufficient to maintain the works in perpetuity. Any balance, after meeting these charges, shall be carried to the debit or credit of the succeeding year.

Corporations who are in a position to carry out the terms of the Act as it stands are enabled to reduce the price of gas to the lowest possible figure; and when, from increase of sales or from any other cause, an excess of revenue is obtained in any year, the gas consumers will benefit to that extent in the following year. But should the corporation working under the Burghs Gas Supply (Scotland) Act be also owners of the electric light undertaking, the gas undertaking will be liable for any deficiency in revenue of the electricity department by the standard clause, which says: "Any deficiency of income in any year not answered out of the reserve fund shall be charged upon, and payable out of, the local rate;" and by the Electric Lighting (Scotland) Act, 1890, the local rate in this case is "the gas-rate leviable and gas-rents and other revenues receivable under the General or Local Act." Admitting that under the same standard clause the net surplus from the electric lighting undertaking in any one year could be carried to the credit of the local rate—*i.e.*, to the gas undertaking—the corporation have also the option of applying "such surplus, or part thereof, to the improvement of the district for which they are the local authority, or in reduction of the capital moneys borrowed for electricity purposes." So I think that you will agree with me that the chance of any surplus revenue from the electricity department coming in the direction of the gas department is very remote.

This obligation on the part of gas undertakings is not confined to paper, like the gas contingent guarantee rate, but in a large number of instances is a very real claim on the revenues of the gas department; and, consequently, a charge is made on the gas department in order to cover the deficiencies, year after year, on the municipal electricity department—*i.e.*, the gas consumer is required to pay more than the cost of the gas, so that the user of electricity may get his supply below cost price. Is this a course of action which can be defended on any reasonable grounds? Is the user of electricity requiring financial support? Generally speaking, the users of electricity are those who prefer it for reasons in which finance is of small consideration, and are prepared to pay the full cost. Then, why burden the gas consumer for another person's luxury or convenience?

It will be admitted that it is necessary, in order to facilitate the borrowing of the capital necessary for carrying on the electricity department, that some guarantee should be offered to lenders in addition to the electricity rates, in the same manner as the gas department has the support of the gas contingent guarantee rate; and so the gas rates have been pledged in security. But I consider that it is a breach of privilege to make repeated claims on the guarantor. The electricity department should be held to the same rule as the gas department, that in fixing their rates they shall be such "as will be as nearly as possible sufficient to meet the costs and charges of, and incident to, the manufacture," &c. What would be thought of the gas department who persistently fixed their price at such a rate as to render an annual call on the ratepayers through the gas contingent guarantee rate an absolute necessity? True, there is one case in which the guarantee rate has been enforced; but that is an exceptional one, and the total revenue from gas in that district barely reaches £2000 per annum.

The levying of an electricity contingent guarantee rate direct on all the ratepayers of any burgh would raise such a storm of opposition that I venture to think the first levy would be the last, and that the full cost of the commodity would thereafter be charged against the users. Yet, in practice, such a levy is actually taking place wherever a call is made on the revenue of the gas department to meet a deficiency on the electrical department; and the levy is made on those parties who are not benefiting from the outlay (*i.e.*, the consumers of gas), while those benefiting (*i.e.*, the consumers of electricity) bear no portion of this indirectly levied rate. Is this fair? Whatever may have been the justification for burdening the gas department with the debts of its rival in 1890, one would like to hear of the man who would justify such action to-day; and if there were no other remedy, it would be our duty to urge at least that the Act be amended so that the deficiency be answered by an electricity contingent guarantee rate. There is, however, a remedy, and a very simple one, already in the hands of every municipal electricity committee—*i.e.*, to make their income sufficient for their outlays by fixing the charges for electricity accordingly.

But there are also a few municipal gas undertakings working under Local Acts; and with most of these the power of dealing with surplus revenue is much wider. In the case of one or two of our larger towns, full advantage has been taken of this, and revenue derived from the sale of gas has been appropriated to such purposes as improving existing streets, opening new streets, erecting, improving, and maintaining municipal and other public buildings, baths, and washing-houses, making sewers, and otherwise improving the respective towns, or else carried to the general purposes account for the relief of the burgh general assessment, or to a similar account.

It has been held that the undertaking is the property of the ratepayers. Is this according to fact? When a gas undertaking is acquired, do the ratepayers, as such, invest any money therein? Is it not the case that it is only nominally their property; for no sooner is it acquired in their name than it is immediately bonded up to the hilt—to use a common expression? And are the repayments of the bond (by sinking fund or otherwise) made by the ratepayers? Nay, verily, but by the gas consumers only, and that through the gas rates. Thus only those ratepayers who are also gas consumers are entitled to claim consideration and benefit as owners of the undertaking; and such limited and justifiable benefit can best be granted by making the gas rates as low as possible, so that there shall be no surplus revenue to apply to purposes in which there are others interested, and benefiting therefrom, who are not contributing to the gas revenue.

It has been held, however, by some that the power to apply the gas contingent guarantee rate entitles the ratepayer to benefit from the surplus revenue of the gas department. Why should it do so? Does not the name of the rate clearly indicate its purpose? By this clause, the ratepayers become guarantors; but it is not in accordance with practice that guarantors, as such, should benefit from the financial success of the undertaking for which they have given a guarantee. The most they have a right to expect is that, in the event of the guarantee being called up, it should be repaid at a subsequent period if, and when, the undertaking is in a position to do so.

I hope I have made it clear that the appropriation of any surplus revenue of a gas undertaking, for purposes other than those of the undertaking, is a system of levying rates under partiality and under a false name; and it is to be hoped that gas consuming ratepayers who have been victimized in the past will see through the folly of such indirect rating, and insist on the remedy being applied.

Discussion on All the Papers.

Mr. A. WADDELL (Dunfermline) thanked the President for the excellent matter put before them. All the papers were of great interest to the gas profession. Those of the President and Mr. Yuill showed the need of such meetings, and of combination on their part to secure fair rating. It would be difficult for even an authority to explain why they were so heavily taxed, as compared with other industries. In the town in which he was resident, there was a mill which turned over in a year seventeen or eighteen times as much money as the gas undertaking did, and yet the mill was taxed at less than the gas-works. He believed this existed generally. It had been brought home that they were living under an injustice. The paper by Mr. Herring was an exceedingly interesting one—perhaps of paramount interest for the time being, in connection with gas undertakings. A great deal of very useful matter had been put forward, which would be helpful to all of them in considering the subject of increasing their gas output. Among other features of the vertical retorts, it was certainly a most desirable thing that they applied equally to small as well as to large works. An effect of this would be that the use of gas would be made still more general in country districts as well as in towns. With regard to Mr. Herring's position upon the question of continuous-intermittent charges, he, in the first place, gave his opinion in favour of continuous charging. This was a difficult question, and depended a great deal upon circumstances. If his own case, for instance, were taken into account, he already handled his coal and coke in trucks containing what would make a nice charge in a vertical retort; and therefore intermittent charging would altogether commend itself. Again, in smaller gas-works, at the present time at least, he could not think of a mode whereby a continuous process could be made easy. Mr. Herring, further on in his paper, pointed out how well the retorts acted which he saw in Glasgow. Thus he apparently, while expressing one opinion, had also favoured another. There were very few of them who were not looking forward to getting much more

important working results from vertical retorts than they did from the charging of their present horizontal retorts full.

Mr. W. Blair (Helensburgh) said the papers by Mr. Yuill and the President showed that electricity, their principal opponent, had been treated as a favoured child, at the expense of others, who had had to bear their burden. He did not see why this should be. Each tub should stand on its own bottom; and the gas-using public should get gas at the cheapest rate. He had been trying to get these things equalized. The subject was one which their parent Associations—the North British Association and the Gas Institution—should take up. They should see that electricity should bear its just burden. As to Mr. Herring's paper, for years he (the speaker) had been giving very serious consideration to the question of carbonization. They required to extend their carbonizing plant; and as each system had come forward, he had been very keen to try to find out which plant would be best suited for them. They had under consideration now the adoption of a continuous system of carbonization, which was the latest and best to-day, and was quite suitable for a works of their size, having a make of about 60 million feet a year. At present, it cost them about 2s. 4½d. per ton of coal carbonized, taking the coal from the store, and the coke to the coke-bing. Under the system they were thinking of adopting, all this came out at a minimum rate of about 3d. per ton; and, of course, they were not large enough to be able to fully take up the work of one man, at their maximum make in mid-winter of from 320,000 to 330,000 cubic feet per day. The whole of the labour of exhauster, pumps, and the like, could easily be accounted for by one man; and they could not get down to a lower rate than this. The cost would be about £170 per ton of coal used, and the return on the outlay would be 12 to 13 per cent. They would also be avoiding the making of smoke, because all steam, smoke, and laborious manual labour would be entirely dispensed with. No doubt with the Dessau system they were getting excellent results; but the old laborious work of stoking was still in existence. He would refer to how much they were indebted to the late Mr. William Young and others, for the state in which they found themselves. It was the Glover-West system he recommended his people to adopt; and he did so for the simple reason that there was less mechanism and less likelihood of getting out of order with it, while the maximum results were likely to be obtained in actual use.

Mr. A. Milne (Aberdeen) thought it was advisable to have a number of subjects to discuss, rather than one address. The paper by Councillor Smith was extremely interesting, and went to show that they ought to have more command over gas-fires than many of them had. True, they had absolute control of fires which were on hire. They should be authorized at least to create a department for looking after purchased fires, as well as those which were hired. No doubt such a proposal would meet with much opposition on the part of the trade; but they had only themselves to blame. He supposed the gas consumers in Aberdeen were no better, and perhaps no worse, than those in other towns; but many instances had been under his observation of consumers coming to them in desperation. They had employed a plumber or gas-fitter again and again, with no satisfactory results. The fact was that gas-fitters had not acquainted themselves with the principles of gaseous firing. He could recall numerous instances of this. A case was brought before him by a doctor in Aberdeen, who had purchased a gas-fire, at a cost of £5, for his waiting-room; and it was very unsatisfactory to find that he had to call in the fitter very often—and he employed one of the best fitters in Aberdeen. When the doctor came to him, he took away the gas-fire, and had it thoroughly cleaned. He found that it was a quite suitable fire, and put it back. It had been replaced only about a fortnight when the doctor called again, and said the fire was very unsatisfactory. A man was sent up, who inquired as to the position of the stopcock, and found that it was placed from 3 to 4 feet from the fire. He naturally assumed then that the trouble was due to the stopcock being so far away. It was found that the maid, for fear of explosion, turned on the gas very slowly, with the result that the fire struck-back every time. The remedy was to place the stopcock close up to the fire. Since this had been done—seven or eight months ago—there had been no trouble with the fire. With regard to the question raised by Mr. Yuill, they had all had the subject before them of late; and he thought they could not do better than each insist upon following out valuations upon the old line of receiving allowance for depreciation. His people in Aberdeen were quite of opinion that the question ought to be looked into. He was particularly interested in the paper by Mr. Herring; and he was sure they all looked forward with interest and anticipation for the results which would emanate from the Granton Gas-Works.

Mr. G. R. Hislop (Paisley) said he had been specially interested in the President's paper on the application of surplus profits, as he presumed he had Paisley in his mind, because there they had very large parliamentary powers for doing things with surplus profits. Of course, they had to put the price on to the gas, in order to do this. They were not entitled to relieve the rates; but they could apply surplus profits for public improvements, such as parks and improving streets. He thought that they would admit that all the members of the community derived some benefit from these; and therefore he drew the line between this and giving away the money for the relief of rates, which was not in accordance with true methods of doing business. Altogether, he considered this system was much better than handing over the money for subsidizing the revenues of electric light undertaking, which they had to do. Where electricity works were saddled upon corporations, it was the invariable practice of the Legislature to link them on to the gas undertaking. It was a hardship that the gas consumer, after paying for his own light, should have to pay for that of others who chose a more luxurious illuminant. No doubt some of the processes that were being brought forward for making gas were sought for the production of coalite and the like; but he doubted whether they would stand an analytical examination. First of all, they found that for every ton of coal treated they required more than twice the coal carbonized; and this, in many cases, would mean new gas-works, where the space was already fully occupied for retort purposes. He could see considerable difficulty in getting people educated to buy and burn the material, at a very much higher price; and they would have got a more costly fire. The consumption of the rich gas with an incandescent mantle would be a great trouble indeed; but he could fancy those who supported the coalite system saying that this could be overcome by the introduction of so much blue water gas as a diluent, in order to get the quality they now had. There, again, they would have to go into this subject with a strong prejudice, as well as sentiment. He maintained that this thing had come at an inappropriate era. If it had come some years ago, it would have had a better chance of getting a hearing; but he feared that, under the difficulties they had, there was little hope of much being made of it, at least for a long time.

Mr. J. Napier Myers (Saltcoats) sympathized with the President in having been called upon a second time to preside at these meetings; but the arrangement had been fruitful in introducing to them a new style of things, which could not be characterized as other than an improvement. He supposed they were heartily in agreement with the view that consumers of gas should not be called upon to pay for electricity through a higher price being charged for gas. There were some towns owning gas-works which were entitled to make an extra profit, to be used for other purposes than for the benefit of the gas consumers. The townspeople had been the original guarantors—the adventurers—and surely they were entitled to a little consideration. An inquiry was being held in Ayrshire into a tramway and electric lighting scheme for three coterminous towns. The Provost of one of the towns said that their best consumers of gas were the Railway Companies who were serving the town, and that if the Companies went in for electricity, a guarantee rate would have to be enforced at once. It was not often that they heard of such a thing being done; but if there was a liability for the ratepayers to pay such a rate, he considered it only fair that if they had the opportunity of making a little money, they should have the power to devote it to some such purposes as those which Mr. Hislop had indicated. With regard to the matter so ably introduced by Mr. Smith, it would be possible to speak at great length about smoky chimneys. In the domestic consumption of coal, they had not made improvement at all commensurate with the advance which had been made in its consumption in steam-boilers. Not far from where they were meeting, an eminent engineer said that steam-engines would be of little use for carrying ships across to America, because it would take three tons of coal to carry one ton of produce. But improvement had been so great and so vast, that the figures might now be reversed; and a ton of coal could bring home 3 tons of produce. While there was this great advance in the science of consuming coal in boilers, they saw no such similar advance in the consumption of coal in domestic grates. If anything, the progress had been backward. This, to his mind, was largely due to the character of the fire-places which were in common use in tenement houses. These were largely the product of Falkirk; and they had been made altogether too cold fires. They had abandoned the use of fire-clay, which was a good non-conductor of heat, and had introduced too much cast iron, and thereby made the fire more cold. The fire-boxes were also smaller, and required frequent stoking. The proper combustion of coal was a very good subject for the Corporation of Glasgow to embark upon. The true line of progress should be in the direction of gas-fires—that the coal should all go to the gas-works, and there be broken up into its constituent products; the part which should be sent to the consumers being pure, and the deleterious matter going into the tar-well. He read the specification of Herring's vertical retorts in the "Journal of Gas Lighting" that morning, and no one could do so without complimenting the inventor upon his gift of clear expression. He had specified exactly what he wanted to do, and how he meant to do it. The specification made the impression upon his mind that it was far too complicated for business. It introduced a series of pipes at the head of the vertical retorts, which one would be disposed to think would be liable to become cavities for the collection of gas, and liable to explosion. Whether this would be so, remained to be seen. He had said that if those engaged in their metropolitan engineering works, who were interesting themselves in the carbonization of coal in bulk—and that had only an academic interest to those who were living in villages—would go to blast-furnaces, they would see that a blast-furnaceman could put in 4 to 5 tons of stuff, with less waste of gas than his neighbour in the gas-works could put in 4 to 5 cwt. of coal. They would get a lesson as to how the work ought to be done. He had a neighbour who consumed and used about 150 tons of coal per day; and he did this with far less noise, smoke, and fuss than they who used one-fifth part of this, in their busiest time, in winter.

Mr. J. W. Napier (Alloa) thought the remarks which had been made were perhaps sufficient; but they ought to congratulate

the Convener upon the arrangement of the subjects, in so far as each subject might be said to have been treated by an expert. Arising out of the papers read by the President and Mr. Yuill, he considered that, as an Association of technical men, they ought to exert their influence in attempting to bring about legislation affecting their own interest. They had the case of the fact of the Electric Lighting Act of 1890 putting a burden upon gas undertakings municipally owned; and, again, they had the effect of the uncreated tax by Somerset House officials, as regarded not allowing depreciation. The time had come when Associations of Gas Managers ought to take a step forward; and in this respect they had had the example, in past years, of the Gas Institution. So far as legislation for gas matters in Scotland was concerned, the Committee of the North British Association might do well to exert themselves in this direction. The trouble the President might have had in knowing what conception was in the minds of the men who carried the Electric Lighting Act of 1890, was not difficult of apprehension, because at the initial stage of the electric light everyone was content that deficits were bound to arise; and no doubt a broad view of the matter was taken—that, in so far as municipalities were suppliers of light and power, the Government of the time considered that any deficit arising, from whatever source the light and power emanated, should bear the loss upon electricity. He was one of the sufferers in this respect. During the past seven years, a sum of about £4000 had been paid by gas consumers to meet the deficits on the Electricity Department. Regarding Councillor Smith's sayings, two very pertinent points arose. What was wanted was more gas consumed, about which there could be no difficulty; and cheaper gas. Now, while they might follow out the policy of fitting up gas-fires free; while they might pursue the policy of hiring-out gas-fires at reasonable rates; and some might venture to go so far as to supply gas-fires free—he had no hesitation in saying this was only a half-way house towards attaining their object. The electrical people sold current at 3d. or 4d. per unit; and they went down so far as ¾d. per unit. There, undoubtedly, they had the factor of consumption affecting the peak-load. At the same time, he did think that gas companies would do well to look into their accounts, and find out precisely what was the cost of their gas into the holder. He found that in Glasgow it was 1s. 1½d. per 1000 cubic feet. He ventured to say that unless gas people were prepared to supply fuel cheap, it was almost impossible to expect the use of gas for heating purposes, because they must recollect that while they gave certain advantages in fixing free or supplying at low rentals, they were still putting on consumers the burden of a dear fuel. As to what means should be devised whereby they could get a cheaper gas supply, of course, they were aware that advance had been made in the carbonization of coal; and no doubt other economies would be effected. But he was inclined to think that if gas departments would only take a bold step forward, and sell gas at a very cheap rate, they would find that the relative yield from consumption would rise so enormously as to provide a very satisfactory return indeed. Regarding Mr. Herring's contribution, the author seemed to be quite convinced that continuous was much better than intermittent charging; and, from what he learned at St. Helens, and also at Sunderland, he was quite satisfied that the continuous system was the best. Mr. Herring stated, as one reason for the increased production of gas in vertical retorts, that this, in small measure, arose from the presence of moisture in the coal. He, however, did not agree with this, because the coal would be denuded of the small amount of moisture it contained when put in at the top, long before it reached the zone of high temperature. But what particularly was troubling gas managers at the present moment was not whether the charging of vertical retorts should be continuous or intermittent, but rather what they were going to do in order to obtain the best results from horizontal retorts. They must recognize that they could not scrap their horizontal retort-benches. And, as far as he had been able to gather, the system of filling the retorts full, giving heavier charges, and the use of a pusher, was going to produce results, so far as the production of gas and residuals was concerned, equal to those obtained with vertical retorts. The only question in the matter was one of labour; and undoubtedly the advantage lay with the verticals. At the same time, he would venture to say that those who were unable to get the full advantage of carbonizing coal in bulk might consider the chamber retort. After all, what they were attempting to get at was the carbonization of coal in bulk; and if this could be attained in horizontal retort-settings, whether in chambers or not, those tied to horizontal retort-benches had the same interest in following the advantages obtained by those who were inclined to introduce vertical retorts.

Councillor SMITH expressed his pleasure, as a member of the Gas Committee, in attending the meeting and hearing many details gone into which, as a Committee, they had not time to learn. He was very much obliged for the way in which his paper had been listened to, and for all the remarks made. He purposely refrained from mentioning any particular form of coke. This he left to the meeting. All that was wanted was a coke suitable for consumption, and this he had no doubt would be obtained. As the Sub-Convener of the Electricity Committee, perhaps they would allow him to assure them that in Glasgow they did not take a penny from the Gas Department towards the Electricity Department. Current was sold to the public at cost price—the same as gas was sold; so that in their case it would be admitted that they were doing right.

Mr. G. KEILLOR (Broughty Ferry) did not understand that the President meant to say that it was necessary for a gas department to provide depreciation. This was a question which the Scottish Office took up with their department at Broughty Ferry two or three years ago; and they were successful in beating off the officials, because they considered that, as they were repaying their capital in from twenty to thirty years, and were maintaining the works, they were not called upon to provide for depreciation. This year, however, the Scottish Office came to them again, and wanted them to create a reserve fund. This was a provision for which he considered there was no need, because if they created a reserve fund, and at the same time maintained the works from current revenue, they were also paying income-tax upon that, and, of course, local rating at the same time. He had in his mind a town which had to give the imposition of a gas contingent guarantee rate very serious consideration. Their legal advisers told them that this was not a rate which could be lightly dealt with. In their opinion, it was simply there to be used in the event of something very exceptional happening—he presumed the stopping of the gas-works or something like that. They advised them very strongly not to put a contingent guarantee rate into operation, because it had been suggested that it might be the means for companies or gas departments creating a deficiency in order to have such a rate imposed so as to help some other department. What the particular town did was to increase the price of gas very considerably; and they got the consent of the Scottish Office to raise the rate over a series of years, which was done. He quite agreed as to the iniquitous custom of taking money from the gas department to meet current deficiencies in the electric light accounts. In his town, the Gas Department had had to pay £1100 or £1200 for accumulated deficiencies; and he did not consider this was just. However, the Electric Lighting Acts said this had to be done; and they could not avoid paying. His Committee approached the Electric Lighting Committee when the money was handed over, and asked that it should be repaid. They were simply laughed at, and told that this was impossible; there was no power or provision in the Electric Lighting Acts to compel the Electricity Department to refund the money. It had been paid by the Gas Department to wipe out their deficiency. They admitted that there was a moral obligation on their part to repay, but that was all; they could not bind their successors in office. The consequence was the gas consumers had to pay to enable the richer inhabitants to obtain a light at a figure below that which they ought to have been paying. He supposed that the reason the Gas Department were made to pay was that it was generally conceded that it was only after two or three years that an electric light undertaking became self-supporting. Their Electricity Department was now on a self-supporting basis. It had a profit last year, and would have a fair profit this year. Turning to Mr. Yuill's paper, they all knew the author to be a past-master in the laws relating to valuation, as well as in the computation of the basis for income-tax. Mr. Yuill had been a little too modest; he ought to have told them that through his instrumentality they, at all events in the north-eastern districts of Scotland, were able pretty successfully to defy the local assessors. They agreed, after some research, that the adoption of the regulation by the Somerset House authorities was optional—that it was not an Act of Parliament. Mr. Yuill told them this at the time—and it was the case—that the Income-Tax Authorities had no right whatever to issue the regulation; and he believed they had been told it pretty plainly by some of the Judges who had tried cases recently. But he considered that the Institution of Gas Engineers, for instance, ought to have exerted themselves more upon this question than they did. He recently had put into his hands a copy of a paper prepared for the Institution by Mr. Schultz, which was merely a collection of historical data; there was nothing in it to guide such as themselves in arriving at a satisfactory basis of valuation. Why could not the Gas Institution go to the authorities at Somerset House, just as the Municipal Electrical Association and the Tramways and Light Railways Association had done. They went; and they had been very successful in their appeals. Unless they in the gas industry did this, they would never get anything at all.

Mr. W. BLAIR pointed out that the matter was under consideration by the Council of the Gas Institution.

Mr. KEILLOR said he was very glad to hear it.

Mr. A. MASTERTON assured the speakers that he was very pleased indeed that they agreed with the opinions expressed in Mr. Herring's paper, because it was a very difficult and delicate matter to be responsible for the opinions of another. He (Mr. Masterton) thought the best policy, seeing that this system of carbonization was, comparatively speaking, in its infancy, was to wait and see, and carefully note the experiments which were being made, and which would eventually be made.

The PRESIDENT would have liked very well if Mr. Yuill had seen his way to have gone a little further, and have dealt with local assessments, because he found there were differences in the way of arriving at what was the actual value of an undertaking for local assessment. This was a subject which, he thought, should be narrowed down, so that there should be a universal system or basis for valuation; or, at any rate, that there should be one system for municipal authorities and one for companies, instead of two or three different methods. Companies were much more settled, because there had been cases before the High Courts, in which there were decisions; but when it came to a question of assessing municipal undertakings, they found that there were very

few cases to which they could refer to find a leading. The case of the Edinburgh and Leith gas undertaking was about the only one in which they had a decision as regarded the rating of municipalities for local assessment.

Mr. YUILL (after expressing his regret that Mr. Smith had had to go away, because he had taken notes of the remarks he put before them, and it might appear invidious on his part now to go into the matter he dealt with) said he thought that in Glasgow they could do very much more than they did, considering the great desire they had shown to lessen smoke pollution. What had they done, more than any other corporation, other than preparing a report? They had really not gone so far as other corporations. The desirability had been mentioned of giving a differential rate —the same as electric undertakings did—for power purposes. They could do this in more than one way. They could give it off the price of gas, or they could lessen the price in another way, by giving cookers free. He thought that Glasgow (from its position geographically, and from its position financially) stood in a better position than almost any other corporation for giving facilities to consumers; and from the experience he had had in giving cookers free, he thought it was one of the best things they ever did. It had contributed to their success in more ways than one. They all realized what a difference it made to them if they were able to increase the consumption 25 per cent. It meant the lessening of the fixed charges, not only fixed charges for interest and sinking fund, but also charges for labour; and they had also the consciousness of conferring a benefit upon their consumers. The works belonged to their consumers, practically; and it was all the same how they gave facilities to their consumers. Seeing that in Glasgow they were so desirous of encouraging the use of gas, or smokeless fuel, why did not they do the same as other municipalities who had done something in that way? With reference to Mr. Herring's paper, it was educative certainly. So far as he (Mr. Yuill) could see, the points in it were the differences between the continuous and the intermittent methods of charging. Suppose they came back to the question, as between horizontals and verticals. In his own case, he could not face the question of the introduction of vertical retorts; but he was in the position of being able to wait, and by the time he could entertain the subject, possibly great revolutions would have taken place, and he would then be able to benefit by those revolutions. Coming to the criticism of his own paper, he was pleased to find that the objections had been very mild. They were all at one in considering the great injustice which had been done to them. When they took the common-sense view of the matter, into what did it resolve itself? Of all the industries in the United Kingdom on which the Income-Tax Commissioners made an annual charge, they said only to gas and water works—"We will not allow you any depreciation, under any circumstances whatever." Why did they do this? Why were gas-works and water-works singled out in this particular way? Possibly it might be imagined that they were so yielding, with a consciousness of their power to do or say anything they liked, and that they would submit. He mentioned in his paper that he thought this was a fit subject for the Gas Institution to take up. He hoped that Mr. Blair, who was on the Council of the Institution, would do all he could to bring the matter up, and insist upon its being put forward, in the way that other bodies had done, and have it fought out with the authorities at Somerset House. He knew of no better body than the Institution to take the matter up, and fight it out.

The PRESIDENT said he had dealt a little, in passing, with the other papers, so that he had only to make one or two remarks upon his own paper. With reference to Mr. Hislop's remarks, he had not Paisley specially in his mind's eye. There were several places just like Paisley, that drew attention to the position and suggested the line of argument which he took up. Even admitting that public parks, and suchlike, were enjoyed by the general community, still they had an unequal rating if it were only placed on gas consumers. Why not levy one on the electric consumer as well, to provide public parks and other improvements? This was the line of his argument. Mr. Keillor referred to the question of depreciation, whether it was compulsory or not. It was not compulsory. Surplus revenue might be applied for the purpose of making a depreciation fund; but it was not compulsory. This was a subject he would like to see fairly well dealt with. He held pretty strongly that when the present generation were providing for all possible repairs, and also providing for a sinking fund, they were doing their fair share; and that the question of providing for depreciation, while renewing the plant from time to time, was one which should be left to a future generation. He would like to see this matter more fully referred to in a paper, and at no distant date.

ADMINISTRATION.

Mr. M'LUSKY said he had been asked to inform those present that the Committee of the North British Association proposed in future to annex the Informal Meeting. He had learned of this since he came into the room that afternoon. He considered it a very excellent proposal, and one with which he thoroughly agreed; but he asked whether they could go into the question that day. It was a large meeting; still it was not a fair representation of the gas managers of Scotland. If they were to hand over the management of these meetings to the North British Association, he thought they ought to insist upon the informal character being maintained. It was proposed to make it the spring meeting of the North British Association and to have no July meeting of the Association, but to have their regular meeting in September.

Mr. WADDELL said it was felt that July was not a very suitable time for the North British meeting; and that if this proposal were carried, it would give some reason for putting off the North British meeting till later in the season.

Mr. YUILL considered the question a very momentous one. The present was the 27th annual meeting. Could anyone say that these informal meetings had not played their part well, and played a noble part? The informal nature of the meeting was one of its safeguards. Speaking from experience as a Past-President of the North British Association, and knowing the difficulty there was to get papers for the meetings of that body, he would not care to undertake the duty of getting papers for two meetings.

Mr. J. W. CARMICHAEL (Barrhead) thought that the question had been sprung upon them. Of the two meetings, he preferred the informal one. They had in April just got over their winter's work, and they met and had conversations together. No reasons had been given for the proposed change. The North British Committee were quite right in putting forward their ideas; but those present ought to have time to consider the matter.

Mr. WADDELL said the Committee would rather that the present meeting should put forward reasons against annexation. They were quite willing to give as long time for consideration as might be wished.

Mr. D. ROBERTSON (Dunoon) thought they should be very cautious in departing from their usual procedure.

Mr. BLAIR said there was no desire to interfere with the informal nature of the meeting. There would be nothing definitely decided that day, as the North British Committee could do nothing until the general meeting of the Association.

Mr. T. WILSON (Coatbridge) did not think annexation would serve any good purpose. He did not see any benefit to be gained. He thought they should refuse the proposal immediately.

The PRESIDENT said he brought forward such a motion four years ago; but it was very much sat upon. They could not decide whether the informal meeting was to be dissolved without reasonable notice being given.

Mr. YUILL moved, and Mr. J. W. NAPIER seconded, that the proposal be not entertained; and this was agreed to without a counter-motion.

Mr. M'LUSKY moved that Mr. J. B. Scott, of Cowdenbeath, be nominated as President for next year. Mr. Scott, he said, originated the North-Eastern Commercial Section, which had been a great success.

The PRESIDENT seconded, and the motion was agreed to.

Mr. SCOTT accepted office, and was invested with the Memorial Chain. He then returned thanks for the nomination.

Mr. YUILL moved that Mr. M'Lusky be reappointed Chairman, which was agreed to.

A company of about eighty gentlemen, at the close of the meeting, sat down to "High Tea," instead of the dinner usual at previous gatherings—Mr. Scott in the chair. After tea, the company dispersed, at the early hour of six o'clock.

The Stone Gas-Works Managership.—In answer to the advertisement which appeared in the "JOURNAL" on the 29th ult., 132 applications have been received for the position of Engineer, Manager, and Secretary of the Stone Gas Company. These have been duly considered; and six of the candidates have been invited to attend a meeting of the Directors on the 15th inst.

Modern Gas-Engines and Gas-Producers.—We have received from the Publishers (Messrs. John Wiley and Sons, of New York) "The Modern Gas-Engine and the Gas-Producer," by Mr. A. M. Levin, M.E., of Chicago. The contents of the book were originally notes arranged with the idea of having for personal use some of the many questions pertaining to the gas-engine which, in practice, often come up and require immediate answers. In order to present this matter properly in a book designed to be of use to others, the notes have been extended and supplemented by other particulars, so as to make them readable. A fuller notice of the book will appear in an early issue. The English publishers are Messrs. Chapman and Hall; and the price is 17s. net.

"Transactions" of the Association of Water Engineers.—We have received Vol. XIV. of these "Transactions," containing the reports of the proceedings at the summer and winter meetings held last year under the presidency of Mr. Robert Askwith, M.Inst.C.E., the Engineer of the Weardale and Consett Water Company. The papers read on the two occasions referred to, and the discussions upon them, were dealt with in the "JOURNAL" at the time; but they, of course, appear in a more amplified form, and with numerous illustrative plates, in the volume under notice. The book contains much interesting matter in addition to the record of last year's proceedings. As in the preceding volume, there is a collection of abstracts of legal cases, all of which, with one exception, were issued to the members as separate pamphlets during the year; and there are useful indexes to the subject-matter in all the volumes. The library catalogue, lists of Council officers, and Past-Presidents, and a statement of the year's accounts, complete the contents, to which a very effective portrait of the President forms a frontispiece. The volume, which will rank for interest with its predecessors, has been produced under the editorship of Mr. Percy Griffith, M.Inst.C.E., F.G.S., the Secretary of the Association.

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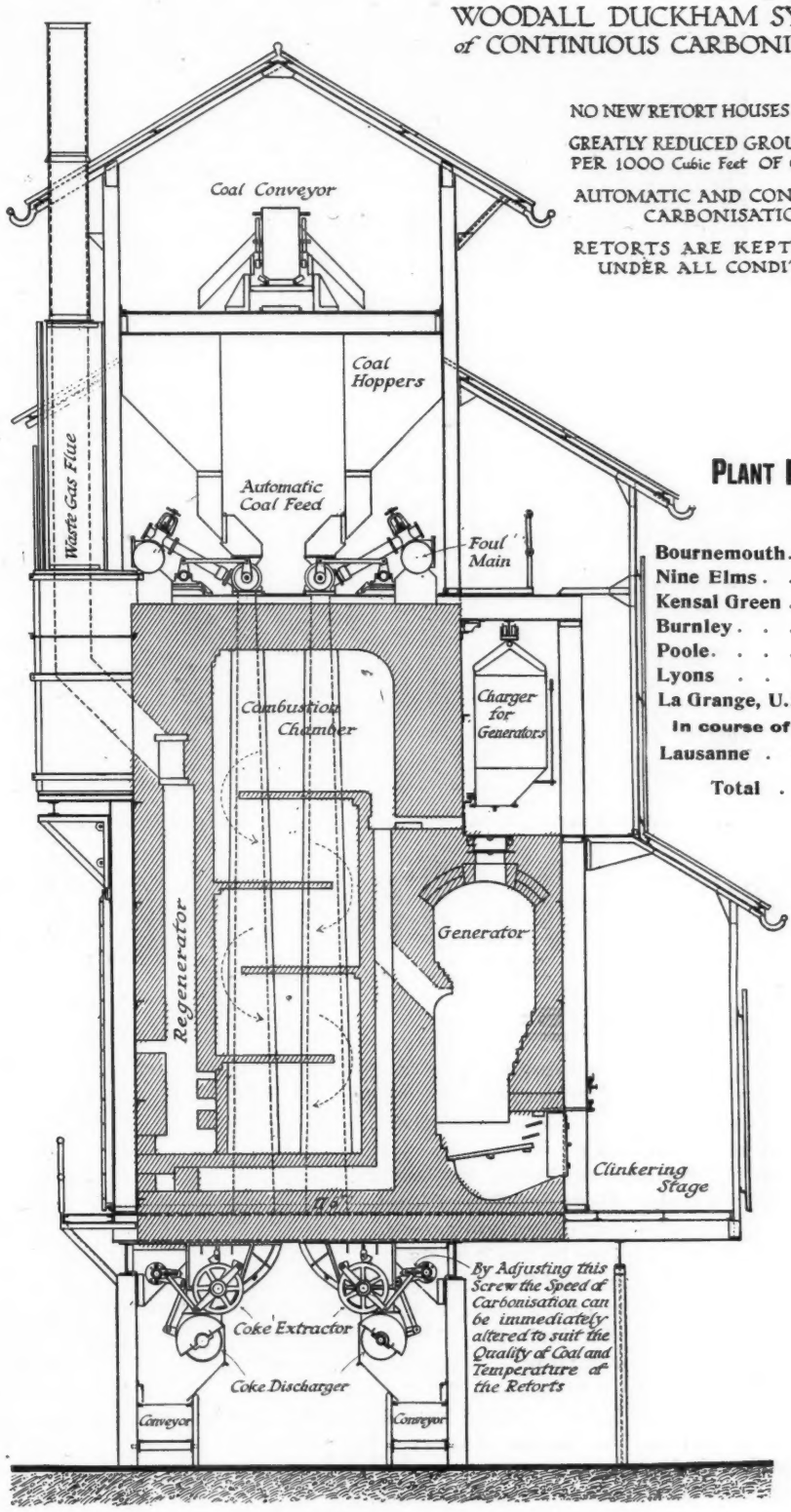

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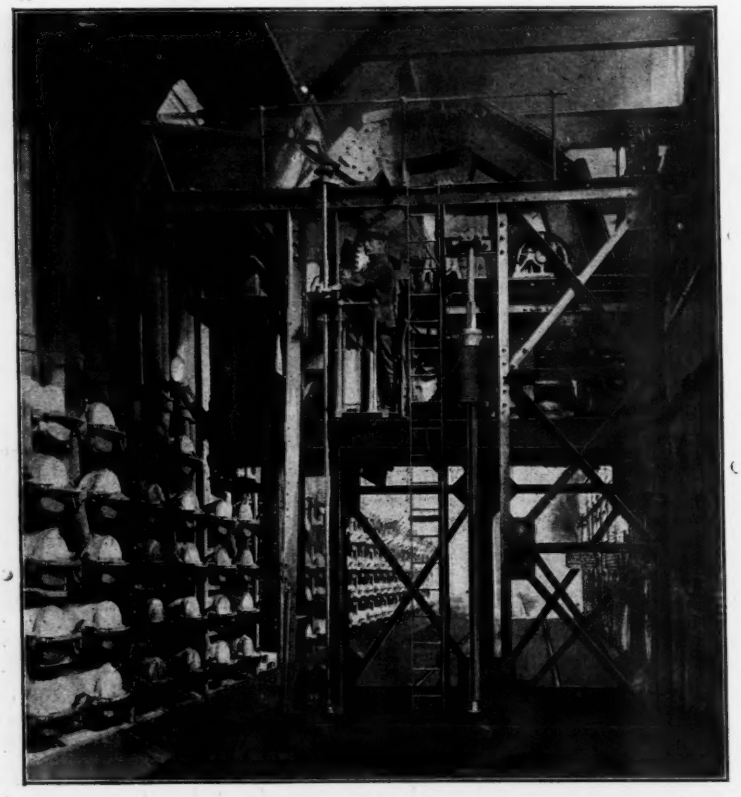

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VERTICAL RETORTS FOR THE MANUFACTURE OF ILLUMINATING GAS.

By Mr. W. R. Herring, M.Inst.C.E., of Edinburgh.

[A Paper prepared for the Informal Meeting of Gas Managers at Glasgow, April 6.]

It is now more than four years since I first took occasion to call the attention of gas engineers to the subject of vertical retorts for coal gas manufacture. The impulse that caused me to do so had its origin in comments by the "Journal of Gas Lighting" (in their issue of Nov. 4, 1905), on a report of the Imperial Continental Gas Association, referring to the fact that the Directors of the Company had, after trial of the vertical system, decided to extend the inclined retort system at their Mariendorf works. A paragraph in my first article reads: "British gas engineers will not necessarily be deterred from giving the matter that close attention which such a system, on the face of it, appears to deserve." These facts suggested to me that the time had arrived when steps should be taken to show to what extent vertical retorts were used for a similar purpose in Scotland.

It is true the oil-works practice is slow distillation with a view to obtaining the maximum quantity of products that can be easily reduced to the liquid state. Coal distillation, however, was not unknown in conjunction with the same process, as the coal used for fuel in connection with the oil retorts was in some systems carbonized in similar retorts forming part of the oil-retort installation; the illuminating gases being taken off and mixed with the oil vapours and the producer gases used to heat the settings.

Our much revered friend, the late Mr. William Young, has on different occasions dealt with this; and I should think it will be admitted that the production of coal gas in vertical retorts is not as novel as some people unacquainted with Scotland seem to imagine.

If we reflect, I think it will be admitted that the factor which has permitted the use of vertical retorts for the production of illuminating gas is the changed conditions under which we are now working. The standard of illumination has been brought down to a degree that is found to be more suitable than a gas of high luminous value, such as was generally supplied a few years ago; and the gas which is now manufactured is much more easily brought to a point of perfect combustion than was the case before.

View of the Upper Part of the Setting. The Stage Level is the Charging Stage of the Inclined Retort-House.

The reduction of the luminous value of gas has, therefore, enabled processes to be successfully prosecuted which formerly dare not be risked when the former high standard prevailed; and many things are now possible in the carbonization of coal which it was hopeless to attempt four or five years ago.

The articles to which I have already referred resulted in an interesting series of interviews with the late Mr. William Young. It appears that the publication of my articles at the time rather trespassed upon the ground that was being covered by Mr. Young and Mr. Glover in the prosecution of their patents for the particular type of plant they were introducing, and which had not then been made public.

During their issue Mr. Young visited me, and we had a long conference on the subject. It was at this interview that I suggested to Mr. Young that the industry would be for ever indebted to him if he would relate his ideas as to how the subject should be tackled. I ventured to suggest to him that his opinions of what takes place in the inside of a gas-retort were accorded the gravest attention by anybody connected with the industry, and that personally I believed he could disclose a very large amount of information which would be of inestimable value to those of us who were engaged in carrying on the work. I take some credit, therefore, for having been the means of persuading Mr. Young to contribute the articles which subsequently followed my own in February, March, and April, 1906, contributed to the "Journal of Gas Lighting."

This intercourse with Mr. Young led to still further interviews, and many interesting conversations; and I think that I am not disclosing any confidential information when I say that only a short time before his death Mr. Young, along with Mr. Glover, expressed a wish that I should collaborate with them in the development of the Young and Glover patented system of vertical retorts. For reasons which it is not necessary now to relate, I refrained from accepting the very kind offer which Mr. Young made; but at the same time I took care to express my high appreciation of his generous proposal. Since that date two distinct types of vertical retort systems for the production of illuminating gas have been developed—viz., the intermittent, represented by the Dessau or German type, and the continuous, represented by the Woodall-Duckham, Young-Glover, and others.

For my own part, I am inclined to favour the system that will permit of the continuous carbonization of coal, and the continuous withdrawal of coke, and thus render gas-making as nearly automatic as possible. The intermittent system differs little from the present retort-house operations of charging and drawing retorts; but, it must be admitted, it is giving very satisfactory results, both as regards labour costs and gas production.

In dealing with the question of results, it is necessary to take a broad view; and the following factors must be taken into consideration: 1. Structural cost. 2. Yielding capacity on a given area. 3. Yielding capacity per ton of coal carbonized. 4. Fuel consumption. 5. Repairs and maintenance and upkeep of the plant and its accessories. 6. Labour costs.

On the face of it, it does not appear that the intermittent system will offer the same advantages under the heading of labour as the continuous system will do

The Edinburgh Vertical Settings of Brick Retorts, Showing the Projecting Ledges for the Stay-Bricks to Rest upon.

The operation of charging retorts from the upper end cannot differ much from the operation of charging other types; and the operatives will be subjected to more discomfort than in either a machine charged house or an inclined retort-house. ' The rate of wages will, therefore, be the same as we understand a stoker's rate of wage to be to-day.

The drawing of the charge necessitates the physical operation of mechanical parts, and the quenching of the coke in the conveyor. I am afraid our present-day operatives would demand the same rate of wage for this work as at present holds good for horizontal or inclined charging or drawing. The saving in labour is, therefore, represented by the extra tonnage handled per man; and this, it must be admitted, will be considerable.

The continuous system, on the other hand, differs very much in this respect. The operations are entirely mechanical and continuous. The work of the operatives is that of lookers on; their occupation being merely the watching of the free running and lubrication of the mechanical parts. The rate of pay for such work should not be on a higher scale than is at present paid for the coal and coke handling plant, which, roughly speaking, may be said to be 33 per cent. lower than the stokers' wage.

1. *Structural Cost.*—The structural cost may be taken at from £175 to £185 per ton of carbonizing capacity per 24 hours for verticals, as compared with £100 to £110 for the inclined type complete equipment, including coal and coke handling plants in both cases.

2. *Yield of Gas on a Given Area.*—The yield of gas on a given area does not differ materially with either of the vertical types or with inclined retorts.

3. *Yield of Gas per Ton of Coal.*—On first consideration, the yield of gas per ton of coal appears to be from 10 to 15 per cent. superior to the former working on the same works; and from published figures the make per ton may be said to range from 12,000 to 12,500 cubic feet. If, however, we look among the published statistics of the industry, we find many moderate-sized works producing this quantity of gas from ordinary horizontal settings. We must, therefore, be careful to determine whether the increased make of gas is due to the vertical type of retort or to the more efficient and intelligent supervision and direction of operations which are generally devoted to a new type or experimental working. Personally, I am inclined to attribute the higher yield per ton to the absence of the hydraulic main, more regular pull or suction on the retorts, and other incidentals—such as most of us know go a long way towards improving the yield from any type of coal-gas carbonizing plant. Then, again, any moisture that gets access to the base of the retort and most of what is in the coal itself in the Dessau plant is converted into water gas—a combustible gas which will add to the bulk produced.

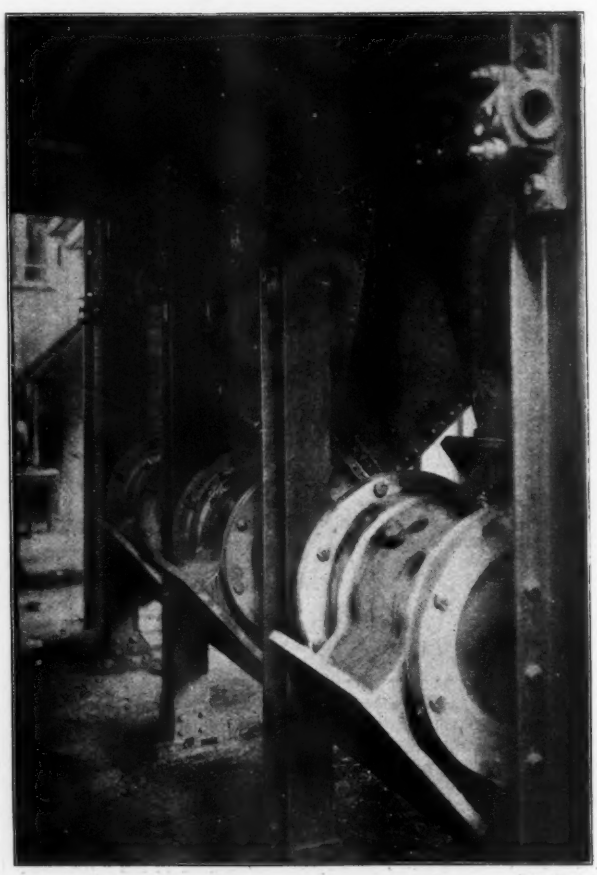
4. *Fuel Consumption.*—The fuel consumption per ton of coal carbonized will not be greater in verticals than in present types. If anything, it should be a little less.

5. *Repairs and Maintenance.*—Repairs and maintenance should also be less.

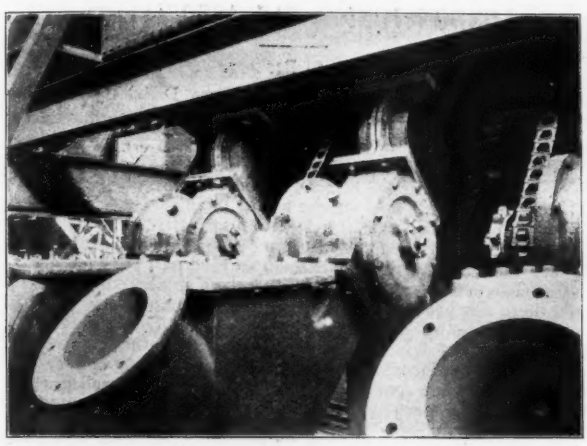
6. *Labour.*—There only, therefore, remains to be considered the question of labour. Abundance of statistics have appeared the Technical Press relative to the working costs of the verticals —partially estimated and partially actual.

The Dessau-Sunderland plant is stated to cost 3d. per ton of coal and the Woodall-Duckham or Glover-West system is estimated to amount to the same sum. Mr. Glover appears to base his wages on the rating for ordinary stokers, which is a factor that should be considered, as it differs from my opinion as to the ratings that should prevail for such work.

Comparing these costs, however (of 3d. per ton), with my own inclined system, they may be said to be only one-third of the inclined installation at Edinburgh, costing 9d. per ton. There would, therefore, appear to be a saving of 6d. per ton; but in



Quenching Hoppers, and Rotating Discharge Valve into the Conveyor (not shown).



The Charging Arrangements by Means of the Rotating Valve. The Gas Take-offs are in the Foreground, and Clear Access to the Retort is Gained by the Central Cover.

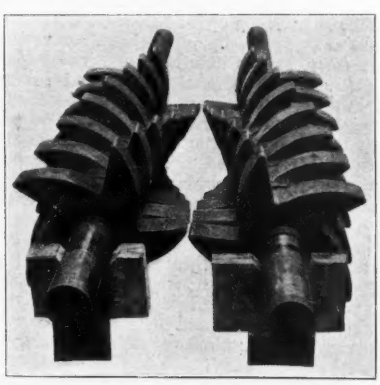
connection with this, we must take into account the capital expenditure involved.

Taking the capital sums already given, and allowing for the installation to be working at its full capacity for 200 days per annum, interest at the rate of 5 per cent. per annum amounts to 6d. per ton on the inclined retort installation and 10½d. per ton on the vertical retort installation.

Adding capital costs to labour, we have 1s. 3d. per ton for labour and capital costs on the inclined retort system, and 1s. 1½d. —a difference of 1½d. per ton—for labour and capital costs on the vertical installation. The vertical system, therefore, does not appear to offer the advantages which at first sight might appear—particularly as my comparison is with inclines worked on 7 cwt. charges, whereas it would be less if compared with inclines worked on full charges. But I have preferred to take the results of a complete year rather than sectional results of our recent working, which has been on the principle of full charges.

Comparing it with other types of plant, however, the vertical retort would show up much better; and having these figures, it will be possible for you to arrive at the difference between your present costs and the vertical costs on your own works.

There is another very great advantage which I think the vertical system will possess; and it is that a comparatively small installation of verticals can be worked at the minimum cost, whereas the small-sized works cannot hope to reach the economy that a large installation of inclined retorts offers.



Details of the Supporting Base for a Positive Discharge and for Breaking the Coke to Commercial or Domestic Dimensions.

It is, therefore, of the utmost importance that the closest possible watch should be given to developments of the vertical type of plant; and I would strongly advise any who are contemplating either an extension or reconstruction of their carbonizing plant to pause as long as possible with a view to giving the closest consideration to the newest type.

Since compiling the preceding notes, I have had an opportunity of inspecting Mr. Wilson's system of verticals at Glasgow, where he has erected a full-scale plant of three 20 feet retorts. The bench was at work at the time of my inspection, and appeared to be doing exceedingly well. Mr. Wilson defines his system as "continuous intermittent"—that is to say, at regular periods 4 cwt. to 5 cwt. of coke are withdrawn and an equivalent bulk of coal charged. I witnessed the operation; and the discharging was most satisfactory. The bottom hopper is sealed by a pivoted water cup actuated by a hydraulic cylinder. Mr. Wilson's object has been to test his setting under all conditions; and on the occasion of my visit he had for some days been using what is probably the strongest coking coal in Scotland. As explained, the discharging was perfect, and the method of charging is novel and appeared to be in every way effective. His results, as far as ascertained, appeared to be fully equal to any of the other systems previously referred to; and I have no doubt we shall hear more of this type in the future.

In conclusion, I may say that we in Edinburgh are nearly approaching the stage when we shall also have working results to guide us. A setting of six verticals is now under fire, and I need not say more than that it is capable of being worked on either the continuous or intermittent system.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Sutherland Meter Company's Works.

On the invitation of the Directors of the Sutherland Meter Company, between sixty and seventy members of the Midland Junior Gas Engineering Association visited the new works of the Company at Witton, near Birmingham, last Saturday afternoon, and were afforded an excellent opportunity of inspecting the up-to-date arrangements and equipments for manufacturing wet and dry meters, test holders, automatic lighting devices, governors, &c. No effort had been spared by the Company to make the visit as enjoyable and instructive as possible. Men were kept at work until the completion of the tour; and members were therefore able to follow more clearly each stage in the production of the modern meter. The visitors (among whom were included Mr. Vincent Hughes, of Smethwick, and Mr. J. V. Stevens—a former member of the Birmingham Gas Committee) were met at the works and guided round by the Chairman of the Company, Mr. A. Cecil Wright, who was assisted by the General Manager (Mr. A. C. Frost), the Secretary (Mr. Madeley), the Works Manager (Mr. Hansford), and Messrs. L. Hughes, Munnings, M'Kay, and Tipper, all of whom were assiduous in their endeavours to reply thoroughly to innumerable requests for information. A description of the works was published on their completion some twelve months ago (see "JOURNAL" for March 16, 1909, pp. 777, 778). It is therefore unnecessary to describe them again in detail.

Commencing at the dry-meter shop at the top of the building, the various processes were carefully explained to the members. All the different parts of a three-light prepayment dry meter were displayed on a bench near by; and it was interesting to note that in the construction of this comparatively small meter no fewer than 255 different parts were required. An object of interest was a very old three-light dry meter undergoing repair at the time of the visit; the badge affixed to the case denoting that the meter was originally made in 1849 by the old Gas Meter Company. Many of the members were surprised to find that dry meters had been made so long ago. The testing shop, wet-meter shop, casting shop, and other portions of the premises were visited.

Meter making alone, however, does not cover the operations of the Company. The manufacture of street-lamps is now quite an important part of their work; and they are also the patentees of many clever devices which were exhibited, some for the first time, including a special pipe-coupling for hydraulic, gas, or steam pipes, which enables joints to be made without the use of soldering irons or the nuisance of "wiping." There were also automatic street lighters of the well-known clockwork type, and one controlled by diaphragm and pilot-light; small secondary meters for gas-fires; high-pressure dry meters; and a small diaphragm governor for high-pressure gas. This governor is fitted with a new combined adjustment for capacity and pressure. In answer to inquiries, it was stated that it was impossible for the pressure to "build up" with this governor.

At the conclusion of the tour, the visitors adjourned to the offices, where high tea had been provided by the Directors.

Mr. A. CECIL WRIGHT, who on rising was greeted with acclamation, expressed his pleasure at meeting the members there. The whole of the officers and staff of the Company had done all in their power to make the visit instructive and pleasant. Having expressed his gratification at the opportunity of meeting the members, he added his best wishes to them individually and as an Association. One heard so much nowadays of the time devoted by young men to sport, that it was almost startling to find an Association such as theirs the members of which were willing to spend Saturday afternoon in inspecting works and processes, and striving to increase their knowledge and experience. He was quite sure such efforts would meet in the future with great success; and he wished all of them success in the future—which they were fitting themselves for, and which they so much deserved.

Mr. R. S. RAMSDEN (Burton-on-Trent), the Senior Vice-President of the Association, in the unavoidable absence of the President (Mr. A. O. Jones, of West Bromwich), asked the members to accord a very hearty vote of thanks to Mr. Cecil Wright and the other Directors of the Company and their staff, for the very enjoyable and instructive afternoon they had given them, and the generous hospitality extended. There was no doubt that, with the higher distribution pressures they had now, compared with (say) 10 or 15 years ago, with the necessity for registering a small consumption of gas by bye-passes of incandescent burners in the daytime, it was absolutely essential for them to have meters which would stand high pressures with perfect soundness, and

which would be found capable of registering minute consumptions with accuracy, or else their unaccounted-for gas would increase. From what they had seen that afternoon of the class of goods turned out by the Company, he was sure they could congratulate them on the articles they manufactured. The Company had a fine site, a magnificent building, and splendid equipment inside. They had been reading a good deal lately of the testing of meters under the Sales of Gas Act; and if, before they separated, Mr. Frost could give them his views as a practical meter maker on this subject, he was sure they would be interesting to them.

Mr. R. J. Rogers (Birmingham), in seconding the vote of thanks, remarked that this was the first works of the kind the members of the Association had had the privilege of visiting. Everything seemed to be done to facilitate the manufacture of meters in the most efficient manner, and to ensure that accuracy which was so necessary. The other portions of the business apart from meter manufacturing—he referred to the self-lighting arrangements for street-lamps, and the governors, &c.—had been a great source of interest to the members. Here again modern requirements were calling for governors that would govern-down pressures accurately both for lighting and heating purposes in manufacturing processes; and it was interesting to see how these articles were being made.

Mr. Vincent Hughes (Smethwick), President of the Midland Association of Gas Managers, cordially supported the motion, and remarked that this was the first opportunity he had had of meeting the Junior Association. He had so thoroughly enjoyed himself that afternoon that he had been thinking seriously of resigning from the parent Association, and joining the Juniors. (Laughter and applause.) He had come to the conclusion that they had a very much better time than the seniors. The works they had visited were certainly very well equipped, and very much up to date. Mr. Wright had expressed surprise that the members of the Association should be willing to give up their Saturday afternoons to study of the kind; but a greater marvel was that Mr. Wright and his Managers had contrived to keep their workmen there during the afternoon, in spite of the attractions of a local football match. Visits to works of this class must be of extreme benefit to the members of the Association, and it was to the Junior Association that they had to look for the men who in years to come would take up the heat and burden of the day, when the seniors had to lay it aside.

Mr. W. S. Smart (Saltley) also cordially supported the vote of thanks.

Mr. G. C. Pearson (Birmingham), who at the last meeting was appointed Hon. Secretary of the Association for next session, took the opportunity of announcing to the members that Mr. H. E. Temple, his predecessor in the office, had obtained the appointment of Assistant Engineer and Manager at Christchurch Gas-Works, New Zealand—a statement which was received with loud applause. Mr. Temple, he said, was leaving the country very shortly, and consequently his attendance with them that afternoon had been rendered impossible.

Mr. Frost stated, in reply to Mr. Ramsden's remarks, that there was severe competition in the meter market; and the old style of manufacturing meters by rule-of-thumb was no good whatever. They had now standardized every part of their meter, thereby benefiting the workmen in making the meters, and enabling them also to put a far better article on the market. They had also developed a department for research work in connection with high-pressure and water gases. This had been of great benefit to them. He expressed his best wishes for the prosperity of the members of the Association.

Mr. J. V. Stevens, who is the local Secretary of the Tinplate Workers' Association, and a former member of the City Council, proposed a vote of thanks to Mr. Wright personally for his kindness and courtesy to them. Gas engineers of to-day were certainly on their mettle, and they had need to be in consequence of the rapid advance of electricity. Incandescent lighting had given a new lease of life to the gas industry; and there was plenty of room for development in the future. There was a great fallacy current that incandescent gas lighting was injurious to pictures and decorations; but some few years ago Professor Frankland, of the Birmingham University, made a series of experiments in the Birmingham Art Gallery, and stated that it was a far better preservative of good pictures than electricity. It was to a great extent to manufacturers like the Sutherland Meter Company that the gas industry owed the rapid developments made in recent years; for new machinery, processes, and inventions were usually brought about outside the gas-works and the gas engineers themselves, though the engineers were the persons who had to judge the worth of the articles. They were indebted, therefore, to manufacturers who were not satisfied to work on the old stereotyped ideas, but constantly invented some new thing. What they had seen that afternoon would set them all thinking. They were indebted to Mr. Wright for his hospitality, and the opportunity afforded them of inspecting the works; and they wished the Company every success in their business. There was plenty of room in the Midlands—usually the home of enterprise—for gas-meter making; and it should be of great advantage and convenience to the gas companies of the district to have such works close at hand.

Mr. Wright suitably responded; expressing the hope that it would not be the last visit the Association would pay them, and that in the meantime many of the members would occupy a high position in the gas profession.

LONDON JUNIOR GAS ASSOCIATION.

Visit to Beckton.

Last Saturday, the London and Southern District Junior Gas Association duly carried out another item in the programme for the current session, by paying a morning visit to the Beckton works of the Gaslight and Coke Company—which they were able to do by permission of Mr. D. Milne Watson, the Company's General Manager. The muster was a large one, as the importance of the occasion warranted; and it is gratifying to note that so many assistants were granted the leave of absence from duty which was necessary to enable them to take part in the proceedings. The main party on arrival must have numbered over sixty; and there was probably an addition of more than twenty to this number made up by subsequent arrivals. Upwards of two hours were spent in inspecting various portions of the huge works; cars drawn by locomotives being requisitioned to convey the members from one spot to another. At each halt (as well as while in the cars) the many points of interest were fully explained by the energetic guides—Messrs. A. H. Solomon, W. H. Warren, S. Thorman, J. Methven, and R. W. Hunter—who were in charge of the parties. Many members, of course, had visited Beckton before (some as lately as last July, with the Midland Junior Gas Association, in connection with which fixture some particulars of the plant and its capacity were given in the "Journal" on July 6, p. 34); but many more who had not done so were naturally much struck with the magnitude of the works and of the operations that are carried on there. Some 263 acres of the 1000 acres or so of land which the Company own at Beckton, represent, it may be mentioned, the area of the works themselves; while the productive power is about 75 million cubic feet of gas a day—13 millions of carburetted water gas.

The visit being timed to take place early on Saturday, the members arrived before the men in the repair and renewal shops ceased work; and a move was at once made to this department, so that the various machine tools, &c., could be seen in operation. The shops are on a large scale, and constitute a department of which the Company are justly proud. The railway cars were then boarded, and a run was taken to No. 2 pier. This is reached by means of a viaduct under which coal is stored. Waggons with bottom discharge doors convey the coal from this pier, and also when necessary from No. 1 pier, and then deposit it where required. On No. 2 pier there are hydraulic cranes, with one-ton Hone grabs. The cranes on No. 1 pier carry skips loaded by hand; and coal is seldom unloaded at this pier, which, however, is used largely for receiving other materials, and for loading coke and chemical bye-products. A pause was made at the hydraulic pumping-house supplying power for the two piers, in which there are five compound hydraulic pumping-engines. The steam pressure in each case is 130 lbs., and the water pressure 750 lbs.

The coal-testing plant, which is a complete installation that would be sufficient in size to meet the requirements of many small country towns, was examined with interest; and afterwards a move was made to No. 3 retort-house (in which at present six and eight hour charges are being worked), containing thirty settings of ten retorts, or 600 mouthpieces. The capacity of this house is about 420 tons of coal a day; and the make of gas 7500 cubic feet per mouthpiece, or a total of 4½ million cubic feet. West's compressed air machinery is in use. The coal-breakers and elevators to the hoppers are driven by a gas-engine. The retorts are set in five tiers, and heated by regenerator furnaces. Some time was spent in the water-gas house, where the twelve sets of carburetted water-gas plant were seen; and then the last building to be inspected was reached—namely, one of the houses containing engines for pumping the gas from Beckton to London (for storage and distribution) through two 48-inch high-pressure mains. There are two of these pumping-houses; and their total capacity is over 4 million cubic feet per hour. Of the many interesting features at Beckton, not the least is the works railway system, consisting of over 40 miles of rails, for use on which there are some thirty locomotives There are high-level roads to take the coal into the retort-houses, and low-level ones for bringing the coke out. Most of the roads are under control from signal-boxes, being worked on the block system; but the coke roads into the retort-houses are worked by hand signalling.

Before the party left the works, the President (Mr. W. J. Liberty) proposed a hearty vote of thanks to Mr. Milne Watson and Mr. Reeson and his staff. It was, he remarked, a great privilege to inspect such works; and under the care of their guides, the visit had been a most interesting and instructive one. Mr. Reeson had said how sorry he was that an engagement had made it impossible for him personally to be with the members; and he had also been kind enough to tell him (the President) that he would like to become a patron of the Association. It was impossible to say how it was that Mr. Reeson's name had been missed; but anyhow this error had now been rectified, and from that day they would have him as one of their patrons. The Senior Vice-President (Mr. L. F. Tooth) seconded the vote, which was cordially passed, and responded to by Mr. Solomon.

Sir William Ramsay, K.C.B., F.R.S., has been nominated President of the British Association for the meeting to be held at Portsmouth next year.

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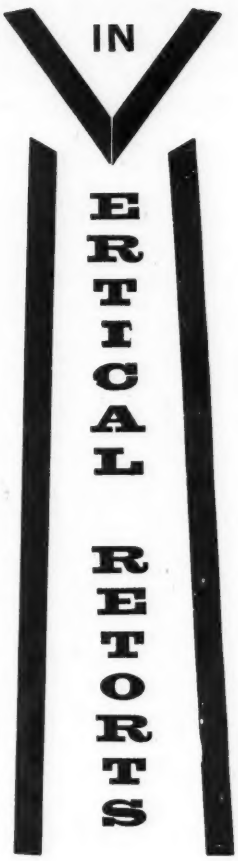

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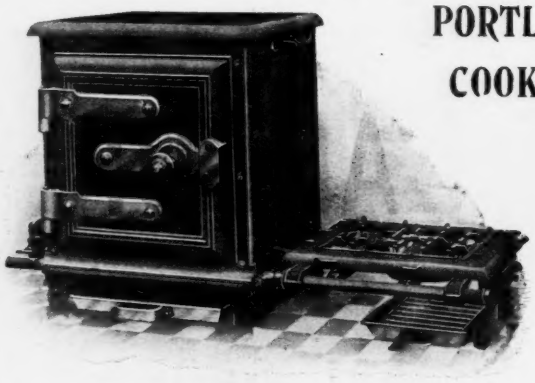

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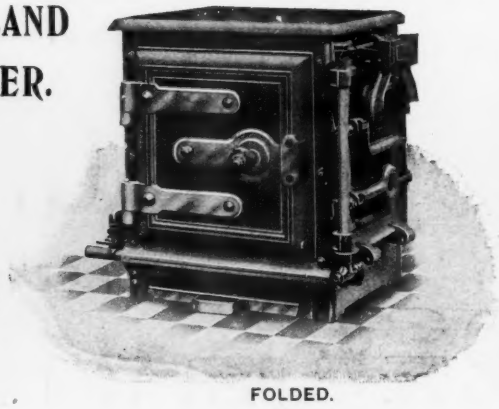

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REINFORCED CONCRETE FOR COKE-BUNKERS.

A Dunfermline Plant.

DURING the past few years, our columns have furnished evidence of the growing use of reinforced concrete in connection with gas-works; and the establishment of a monthly publication devoted mainly to this class of construction is a proof of the extended interest now attaching to it. The current number of the publication referred to—"Concrete and Constructional Engineering"—contains an illustrated description of a large reinforced concrete coke-bunker which has been erected at the Dunfermline Gas-Works, in accordance with instructions by Mr. Alexander Waddell, the Gas Engineer to the Corporation. Some of our readers may remember that reference was made to this coke-receiver in the course of the report of the visit of the members of the Eastern District Division of the Scottish Junior Gas Association to the Dunfermline Gas-Works which appeared in the "JOURNAL" for the 16th of November last (p. 474); and it is hoped the additional particulars and illustrations which, by the courtesy of the conductors of the publication already referred to, we are now able to give, and which were supplied by the Consulting Engineers (Messrs. F. A. Macdonald and Partners, of Glasgow), may be of interest to a larger number of readers than those who were afforded by Mr. Waddell an opportunity of seeing the bunker during its erection.

The original intention of the Gas Commissioners was to use steel columns and longitudinal girders; but, on the suggestion of the Consulting Engineers, this idea was abandoned, and a monolithic reinforced concrete structure was adopted. As will be seen from the photograph, the bunker has been constructed over two lines of railway sidings—the one passing directly beneath it being used for discharging into a receiving bunker below the ground level, as well as for loading into railway trucks from the large bunker above; and the other, passing below the outer reinforced concrete cantilevers, being used for ordinary siding purposes, and also for loading.

At the top of the bunker, and supported by large reinforced stay-beams, there has been constructed a receiving hopper, and also a reinforced concrete bottom for another storage hopper for breeze. The total weight of contained material on which calculations for the design of the structure were based was 350 tons of coke in the large bunker and 40 tons of breeze in the hopper receiving it—making in all 390 tons more than the self-weight of the structure. In addition to these loads, reinforced concrete brackets have been constructed, monolithic with the main bunker walls, to carry those arising from the roof principals and the roof girders of the adjoining buildings.

The coke is fed into the bunker by means of a revolving screen, erected on a platform adjoining the main bunker at summit level. This platform partly obtains support on the reinforced concrete structure. To enable the coke to be dropped from the screen into the main bunker without being broken, and to form a support

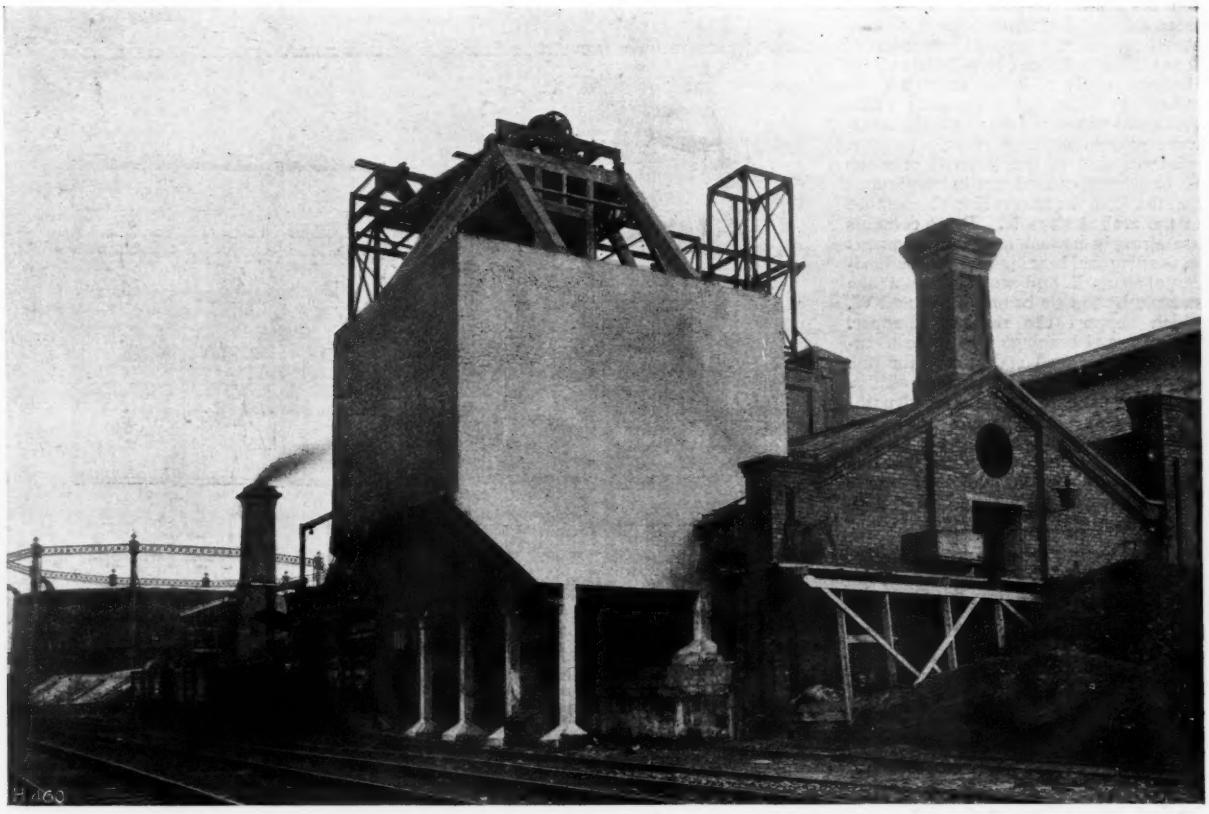


Fig. 1.—Reinforced Concrete Coke-Bunker at Dunfermline.

for the end of the coke-screen, a reinforced concrete structure has been put up within the main bunker, comprising four columns, braced together with diagonals, and supporting a series of inclined and graduated slabs, each so formed as to be slightly concave on its upper surface, and down which the coke will flow, eventually heaping-up within the storage bunker at its natural angle of repose. At the summit of the main structure, as already mentioned, there has been constructed a receiving hopper, having four openings, fitted with hinged steel plates, which will be kept closed until the coke in the main bunker reaches the level of the sliding doors, when these will be released—thus enabling the bunker to become completely filled.

Inclined reinforced concrete beams have been introduced in the design, for the purpose of staying the summit of the structure. The space between two of the large arched stay-beams has been filled in on one side with a reinfored concrete slab—thus forming the bottom of the breeze hopper. The whole arrangement is one of particular efficiency and ingenuity. The position of the main columns in the transverse direction is limited by the presence of the railway sidings, which existed prior to the construction of the bunker; and this necessitated the cantilevering out of two sides of the bunker beyond the columns as shown, and complicating the problem of design. The reinforced concrete columns on the one side are 12 in. by 12 in. section, and are supported on reinforced concrete bases, the loads from which are again spread by means of a special beam along the length of an existing masonry wall, constructed as a retaining wall, and having a minimum breadth at the top of 2 ft. 6 in. On the other side, the breadth of the supporting columns was necessarily limited on account of the Board of Trade regulations for the clearance of railway traffic; and the section adopted was 12 in. by 9 in. On this side also the loads from the columns are received on reinforced concrete bases, and the loads again spread by means of a special beam.

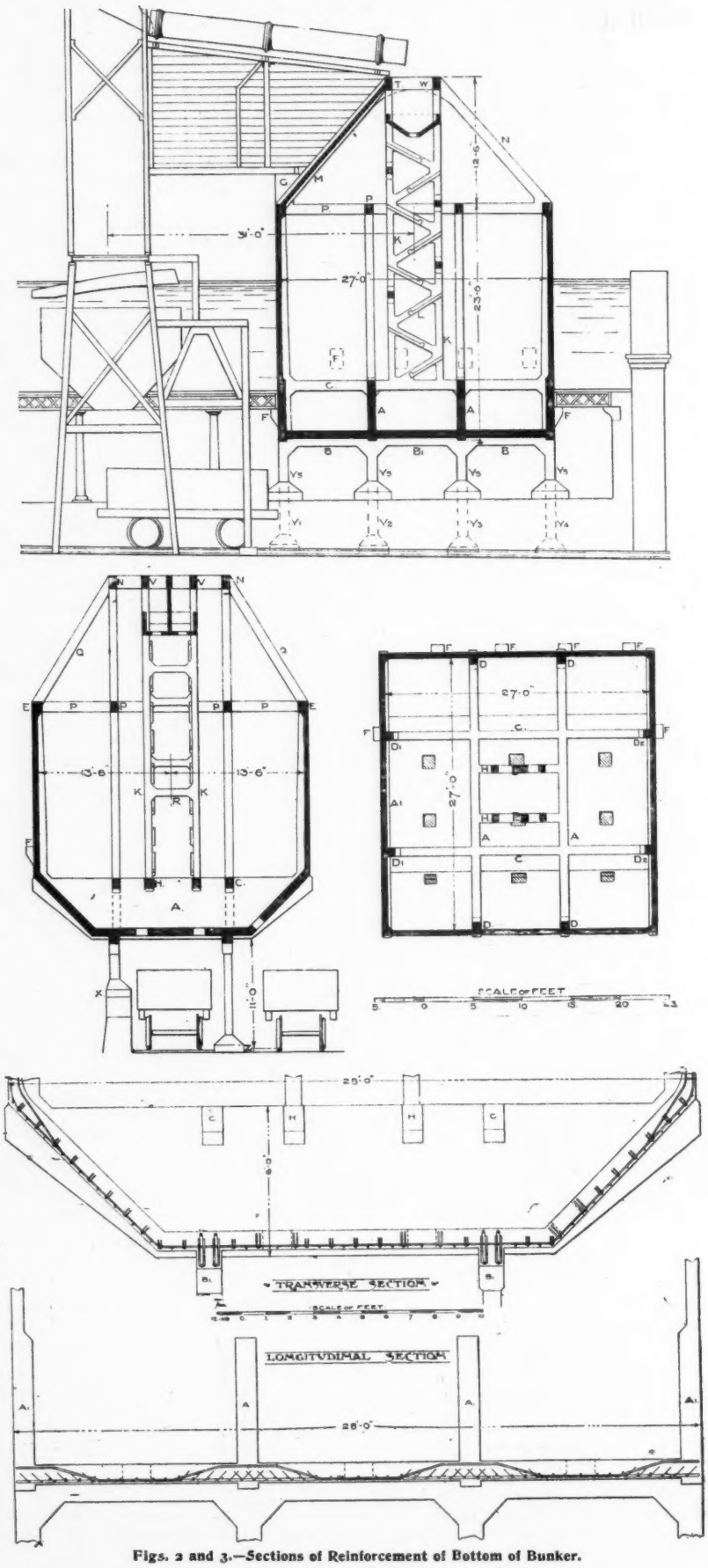
The ground under this line of columns was found to be of the nature of "forced" material for a considerable depth. This difficulty was dealt with by excavating a broad trench down to the hard—the trench being timbered in the usual manner. After the excavation was complete, the trench was filled up solid with lime concrete—thus practically forming a continuous wall. Above the wall the special beam already mentioned was constructed, and after completing this foundation beam the making of the column bases and columns was proceeded with.

The diagrams (figs. 2 and 3, p. 114) show the method of reinforcing the bottom of the bunker, which is 9 inches thick, and supported on the main reinforced concrete cantilever beams running transversely, and on the reinforced concrete T beams B1

running longitudinally. The method adopted by the Consulting Engineers, of reinforcing the bottom of the bunker, which has an enormous load to carry per square foot of area, is exceedingly interesting. The main reinforced concrete girders are braced top and bottom by reinforced concrete beams at right angles thereto—at the bottom by beams—which, in addition to being calculated and designed as beams, are also further reinforced as struts and ties, and at the top by struts designed and reinforced as struts and ties. Certain of the reinforcing bars of some of the beams are hooked round the buttresses of the end walls; their section being calculated so as to enable them to act as ties as well as struts.

The outer walls of the bunker, resisting the thrust of the contained coke, are 6 inches thick; and their span in the horizontal direction is lessened by the introduction of buttresses or vertical beams, which are held at the bottom by tie-beams, and at the top are received into other beams.

The internal structure for ensuring the downward gradual flow of the coke into the bunker is of itself an exceedingly interesting and somewhat intricate construction, and the general formation of it is shown in fig. 2. It will be noticed that the whole of it is carried on the subsidiary independent beams H, which are again supported by the main cantilever girders A. For greater rigidity, reinforcement of the internal columns K has been carried up, in continuous lengths, from the beams H to the summit of the arched stays N. These columns are strongly braced together by means of the diagonal bracings L and the horizontal struts R, and are also held at the summit by the tie-beams T, V, and W, which support the receiving hopper. The diagonal bracings also serve to receive the inclined slabs; and for this purpose they are constructed with a projecting fillet for part of their length. The coke, as already mentioned, flows down the series of inclined slabs so that it is not broken in its descent, and finally spreads out to its natural angle of repose in the main storage bunker.



Figs. 2 and 3.—Sections of Reinforcement of Bottom of Bunker.

A CONCRETE STAND-PIPE.

A reinforced concrete stand-pipe, 90 feet high and 30 feet diameter, located at Empalme, Mexico, and supplying water to the town and to the shops of the Cananea, Yaqui River, and Pacific Railroad, has been described in "Engineering Record." The pipe was filled with water in January last year, after it had been allowed to cure for four months after placing the last concrete. During the first two or three weeks, the entire surface was wet, as if sweating. This slight leakage stopped after three weeks; leaving blotches of efflorescence having the appearance of salt. The stand-pipe is now perfectly dry except one very small spot near the base which remains damp—indicating probably a less dense concrete at this point than in the rest of the pipe. There are indications, however, that this hole, like a number of similar ones, now closed, is gradually being filled with sediment.

It was noticed that the first dampness appeared on the outside of the pipe in horizontal rings at the junction of the old and new concrete where the forms were raised; and whatever efflorescence is still evident streaks down the pipe from these horizontal lines. Since the work was carried up continuously, or as fast as the forms could be raised and the bond of the concrete was made as perfect as possible, the engineer in charge of the structure believes that the weakness at these points indicates that the concrete there was inferior, despite the fact that precautions were taken to secure a good bond by carefully cleaning the old concrete and brushing it with neat cement before depositing the fresh concrete. The pipe is located in the centre of the city plazza; and it is the intention to start vines at its base, so that the entire surface will eventually be covered. The structure was waterproofed by using 6 lbs. of Medusa waterproofing compound to each barrel of cement, and painting the inside with one coat of Werco waterproofing cement.

ASSOCIATION OF ENGINEERS-IN-CHARGE.

The Decay of Apprenticeship.

The annual dinner of the Association took place on Saturday, in the King's Hall at the Holborn Restaurant, when a party of considerably over three hundred (including the Lord Mayor, Sir John Knill, Bart.) sat down, under the chairmanship of Mr. Henry Adams, M.Inst.C.E., M.Inst.M.E., the President; the Vice-Chairman being Mr. A. E. Penn. A musical programme was rendered while the dinner was in progress; and the toast list which followed was interspersed with songs.

The Loyal Toasts having been duly honoured, that of "The Association" was proposed in felicitous terms by Mr. Henry W. Handcock, Assoc.M.Inst.C.E., M.Inst.E.E., who coupled with it the name of the President, and highly praised the work performed by the various officers. In the course of his reply, the President expressed his thanks to the Lord Mayor for the great personal honour he had conferred upon the Association by his presence there that evening. They knew that Sir John Knill took great interest in many questions; and one was a matter which affected the Association very closely—that of apprenticeship. He thought that almost all the members had served their apprenticeship, and so were aware of the advantages that ensued from such a course. Their title was the Association of Engineers-in-Charge; but he noticed that nothing was said as to what they were in charge of. In some cases, he feared, they might be in charge of the failures of other engineers.

Sir Alexander B. W. Kennedy, LL.D., F.R.S., submitted "The Lord Mayor, the Sheriffs, and the Corporation of the City of London;" remarking that probably one of the reasons for which they were honoured with the presence of Sir John Knill was that they were an Association nearly all the members of which had passed through an apprenticeship. At any rate, he (the speaker) served five years in Millwall. Of course, among engineers, it had no doubt been easier to keep up the serving of some kind of apprenticeship than in other trades. There had come an odd sort of revulsion—perhaps more in America and Germany than here—and people had gone the length of saying that no practical training at all was necessary. All one needed to do was to go into a polytechnic or college of some kind, from which a youth would be turned out ready to earn his living. Only a few years ago, a really representative Committee was appointed to go into the matter; and the almost unanimous conclusion of the members was that, though it was necessary for a man to get a theoretical training, it was also in all circumstances absolutely essential that he should have a practical training, and that even civil engineers should spend part of their time in ordinary mechanical workshops. The Institution of Civil Engineers, in particular, had shown clearly the great importance they attached to apprenticeship, by making it much easier for a man who had gone "through the mill" to enter any of the grades than one who had not. As he had said, with engineers it had been comparatively easy to keep up an apprenticeship system, and alter it as the years went on to conform to the needs of modern times; and he quite recognized that in other businesses where anything like continuous training had disappeared, the question was a much more difficult one. The members of the Association hoped that some means would be found of overcoming these difficulties, and believed that, when they were overcome, the benefit to the country would be as great in every respect as would be the honour that would belong to the man who overcame them. He himself felt very strongly that it was time the great Trade Unions, who controlled so many men, recognized this matter. It was all very well to devote attention to getting more wages for everybody concerned. He had no fault to find with this. But presently there would come some Trade Union leader who would be more broad-minded than some of the men now were; and he, it was to be hoped, would take for his ideal not simply and solely the man who worked the fewest hours for the largest number of shillings a week (which was really a mean ideal of itself), but would strive to produce the best workmen he possibly could, and would insist that steps should be taken to this end by masters as well as by men. Then he trusted, and believed, they would have the best body of workmen in the world.

The Lord Mayor, in responding, expressed his pleasure at being the guest of the Association, and his regret that the Sheriffs had been unable also to be present. With regard to the Association, he understood that, before joining, all members had practically to be apprenticed. With reference to the apprenticeship system and his scheme—which he hoped would bear fruit—what he really wanted, at the commencement, was to revive the old system of apprenticeship. Plenty of cold water had already been thrown upon him; and he was ready to confess that there were many difficulties in the way. But what thing that was not difficult was worth taking up? Only the other day he was told that a man objected very strongly indeed to his son being apprenticed to a trade; and on being asked the reason, he said: "If my son learns a trade in that way, he will most likely do his work better than I can; and I shall probably have to join the ranks of the unemployed." It seemed he could not realize that, if his son did not study, that son would ultimately join the unemployed.

Owing to the absence through illness of Mr. James Swinburne, F.R.S., the toast of "Our Guests and Friends" was entrusted to Mr. W. H. Patchell, M.Inst.C.E.; and this was replied to by Judge Rentoul, K.C., and Sir David Gill, K.C.B., President of the Institute of Marine Engineers. "Our President" was submitted by Mr. A. E. Penn, who referred to the good work that Mr. Adams had done for the Association. The President's reply brought this portion of the proceedings to a close.

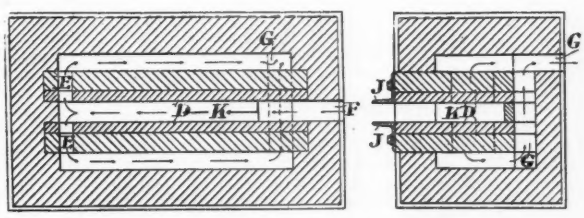
REGISTER OF PATENTS.

Gas-Fired Furnace.

FLETCHER, RUSSELL, AND CO., LIMITED, NEIL, A., and FLETCHER, T. W., of Warrington.

No. 6910; March 23, 1909.

This invention relates to a gas-fired furnace for heating bars, plates, and the like requiring to be hardened, tempered, or otherwise treated; the object being to enable the furnace to be easily and quickly repaired, and to utilize the heat to the fullest extent.



Fletcher, Russell, and Co.'s Gas-Heating Furnace.

The furnace is constructed with a metallic casing or shell lined with fire-bricks; while ledges or supports secure fire-clay slabs D superposed and extending to within a short distance of each end. A narrow space E is formed in the slabs at the inner end of the furnace; and gas-burners are fitted at the end of the casing at F in such positions that the flames pass between the slabs, return partly under the bottom slab and partly over the top slab, and pass thence to the flue G, which is closed to the passage K by a partition. By these means, when repairs are required it is only necessary to remove the bars J and withdraw the defective slabs from the front of the furnace.

Pyrophoric Masses.

BLOXAM, A. G.; a communication from Treibacher Chemische Werke G.m.b.H., of Treibach, Austria.

No. 8163; April 5, 1909.

In this specification, the patentees remark: Pure cerium when exposed to the air becomes coated with a thin layer of what appears to be suboxide, but generally contains a small proportion of nitride; and this layer (in contradistinction to the unattacked metal) has pyrophoric properties. Alloys of the metals of the rare earths which are rich in cerium behave like pure cerium. Now it is a noteworthy fact that this layer is formed more quickly on the most powerfully pyrophoric alloys consisting of rare-earth metals and heavy metals (such as iron, nickel, cobalt, or manganese) than upon alloys which are less pyrophoric. It may be deduced from this fact that, in all probability, the pyrophoric behaviour of all alloys of the rare-earth metals is essentially dependent on the speed with which the suboxide layer is formed. It may be taken as generally true, therefore, that, with the formation of suboxide layers, the pyrophoric power of all rare-earth metal alloys is found to be much increased.

Since the substance constituting the "layer" (termed "suboxide" whatever its true nature) is tolerably stable in air, attempts to manufacture pyrophoric masses of rare-earth alloys having suboxide admixtures in the mass suggested themselves; and the present invention consists in the manufacture of such pyrophoric masses; the preferred procedure being as follows.

The alloy is first reduced to a fine powder or fine chips by abrasion or scraping; air being excluded if necessary. The powder or chips are then compressed by strong pressure in suitable moulds; and the compact mass obtained has a metallic appearance, but is not considerably more pyrophoric than the original substance. The compressed mass is now heated with a suitable oxidizing agent—air is most convenient, in which case the heating is conducted with a volume of air about equal to that of the compressed mass, in a metal casing having thin walls and adapted to be closed. The heating is at first gentle and gradual, but rapid at the conclusion; finally attaining a temperature corresponding with incipient red-heat. A lively reaction ensues; and the mass glows and frits together. The fritted mass exhibits a clear metallic lustre on a freshly filed surface. The embedded suboxide is not visible to the naked eye.

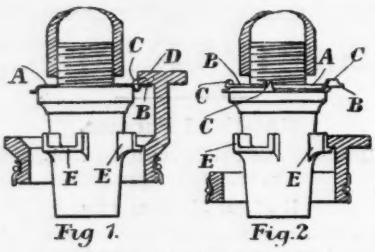
The mass is stable in air like the original alloy, but possesses a higher degree of pyrophoric power than the original alloy—that is to say, the particles separated by means of any tool are more easily inflammable in the air, and smaller mechanical power suffices to produce sheaves of sparks, than with the original alloy. If the proportion of air enclosed is too great, the heating may result in the fusion of the alloy. Such fusion renders the alloy homogeneous again, and the pyrophoric power of the mass is not appreciably greater than that possessed by the original material. If a strongly pyrophoric alloy of cerium and iron is subjected to the treatment described, a mass is obtained, the pyrophoric power of which is so increased that "by lightly drawing a knife blade across it an actual sheet of flame is produced."

Mantle Carriers for Inverted Gas Lamps.

COWAN, T. W., of Rotherham.

No. 9889; April 26, 1909.

This invention has for its object to provide a device whereby nozzles made for supporting one size of mantle-carrying ring can be utilized to support rings of larger diameter.



Cowan's Inverted Mantle Carrier.

The illustration shows a nozzle attached to a gas-supply pipe with a device in accordance with this invention in position. Fig. 1 shows the device supporting a mantle-carrying ring of large size; fig. 2, a mantle-carrying ring of small size carried by the nozzle in the usual way—the device which is provided in accordance with the invention being, in this figure, shown in edge view in place but not in use. The device A is provided with projections B, having their end edges at C turned up to form rests for securely supporting the mantle when the projections D on the ring which carries the mantle have been passed up between the usual projections E on the nozzle and between the projections B of the device, and the mantle and its supporting ring have been turned so that the projections D are brought over and allowed to rest on the projections B. The device is shown as being supported upon the shoulder of the burner nozzle; the opening in the middle of the device enabling it to be slipped over the screw end of the nozzle when it is removed from the gas-supply pipe.

Burners of Incandescent Gas-Lights, Gas-Stoves, Soldering Irons, &c.

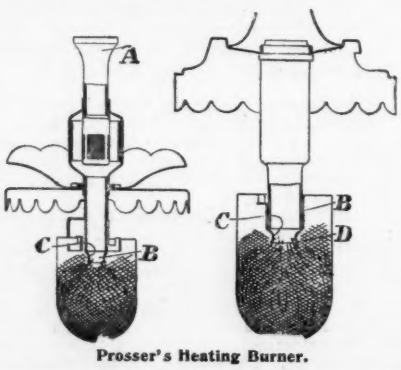
PROSSER, H. R., of King's Heath, Worcester.

No. 10,518; May 4, 1909.

This invention relates to gas-burners of the class having a jet surrounded by a mixing-chamber which is connected to the nozzle by a mixing-tube—such burners being used for heating the mantles of incandescent lights, gas-stoves, soldering irons, bunsen burners, &c., to all of which the present improvements are applicable.

In this class of burners, the mixing-tube connecting the jet with the nozzle is generally of relatively small diameter throughout its length—"probably with the object of preventing firing-back," the patentee remarks; but this method of construction is open to the objection that considerable frictional resistance is set up to the flow of the gas, while a further disadvantage exists in the shape of the flame obtained, consisting as it does of a long, pointed jet, which is inefficient for heating an incandescent mantle for example.

According to this invention, the mixing-tube is of increased diameter, to reduce the surface-friction and allow the gas to flow unimpeded through it, and to prevent the firing-back which would otherwise occur by reason of the attenuated condition or low velocity of the issuing gas consequent upon the increased area. The mixing-tube is constricted near its outlet so as (in conjunction with the configuration of the outlet described later) to spread the flame into a ball shape, and satisfactorily effect the heating of the mantle or other article.



Prosser's Heating Burner.

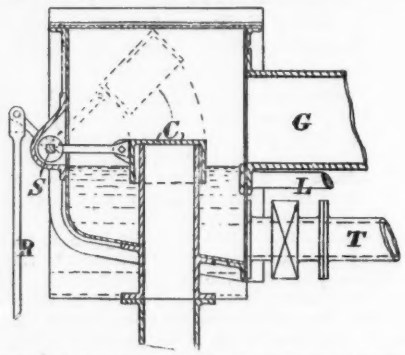
In the form of the invention shown as applied to a small incandescent lamp, and to a larger one, the usual mixing-chamber, air-regulator, and jet are provided; the mixing-chamber A being advantageously extended without any diminution in diameter down to the nozzle B, from which the gas issues. The nozzle is arranged with an internal rib C of semi-circular section, the outermost portion gradually opening out to a bell or trumpet shaped mouth D—a configuration said to be particularly effective in spreading the flame, or causing it to assume a ball shape. In some cases the nozzle B may be a separate fitting (as in the larger form shown) for attachment to the mixing-tube or to existing fittings. "By maintaining the mixing-tube as a spacious chamber to substantially the point of combustion, and by restricting the nozzle from which the gas issues into the mantle, a maximum pressure is ensured at the nozzle; the gas being consolidated or compressed, and thereby expressed from the nozzle in such a manner as to produce a particularly satisfactory flame."

Anti-Dip Hydraulic Main Valve.

THOMPSON, E., and SIMKINS, F. W., of West Bromwich.

No. 11,787; May 19, 1909.

This invention has for its object an improvement for raising and lowering the caps over the top of ascension pipes, so that the resistance offered by the seal in the hydraulic main, and the usual bend pipes into it, may be dispensed with, and the pressure in the retort relieved, while, at the same time, the advantages of the seal are retained during the process of discharging and charging the retort.



Thompson and Simkins' Hydraulic Main Valve Arrangement.

The caps C are connected by a shaft to spindles S connected by levers to rods or chains R actuated by hand from the retort-house floor. During the period of gas making, the cap is raised into the position indicated by dotted lines; so that the gas issuing from the retort has a free passage from the ascension pipe direct into the hydraulic main, through the bottom of the latter, and thence, by the pipe G, into the foul main. On the other hand, while the retort is being discharged or charged, the rod or chain is released, and the cap falls over the top of the ascension pipe and dips into the liquor, which is maintained at a constant level by a tar-tower in the usual way through the pipe L. In this way, a hydraulic seal is formed, which prevents the passage of gas or air from one side of the seal to the other.

The top of the ascension pipe projects a few inches above the level of the liquor, in order to prevent the liquor from flowing back into the retort.

The level of the bottom of the gas outlet pipe must be intermediate between the liquor level and the top of the ascension pipe; so that in case the pipe L gets stopped up, or the liquor level is raised by any accidental cause, the liquor will leave the hydraulic main by the pipe G before it will overflow the ascension pipe.

The bottom of the hydraulic has a fall from front to back, to facilitate tar being removed by the pipe T in the usual way.

Substance for Igniting Purposes.

KUNHEIM AND CO., of Berlin.

No. 16,211; July 12, 1909. Date claimed under International Convention, Jan. 25, 1909.

This invention relates to the production of metallic substances that exhibit pyrophoric properties—that is, small particles detached from them by scratching or scraping with hard objects (files, knives, toothed wheels, or the like) appear in the form of sparks, with which combustible gases can be ignited.

It has now been discovered, the patentees claim, that the hydrides of the rare-earth metals, either singly or mixed together, assume a form that is stable in the air, without impairing their useful properties of producing ignition when they are combined with not difficultly fusible metals, or with hydrides of the latter. The employment of magnesium and aluminium has been found particularly suitable. When the hydrides of metals of the rare earths are used as a basis for the preparation of such combined hydrogeniferous substances, the hydrides are incorporated at a heightened temperature, with some other metal or metallic hydride—more particularly metallic magnesium or aluminium or hydride of magnesium; the amount of the adjunct being selected in accordance with the degree of pyrophoric power desired.

Their invention is thus set forth: The production of (1) Spark-giving substances formed of a hydride of a rare-earth metal or metals fused along with not difficultly fusible metals (especially magnesium and aluminium); these substances being hydrogeniferous and stable in air. 2. A method of preparing highly pyrophoric metallic substances that are stable in the air, and of the kind specified, characterized by the fact that the hydrides of the rare-earth metals, singly or mixed together, are fused along with other metals, especially magnesium or aluminium, or the hydrides of same, and, if desired, subjected to an after treatment with hydrogen. 3. A method of preparing highly pyrophoric metallic substances characterized by the fact that metals of the rare earths, either singly or mixed together, are fused with the supplementary metals, and the resulting substances are heated in a current of hydrogen at a suitable temperature until they acquire the desired degree of pyrophoric power and stability in air.

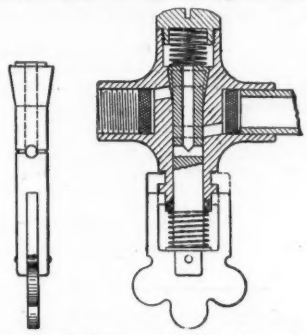
Safety Gas-Cock.

LIDDLE, J.; a communication from the HASTY MANUFACTURING COMPANY, of Chicago.

No. 16,858; July 20, 1909.

This gas-cock (as shown) cannot be accidentally turned on after the gas has been turned off; the construction being such that the cock is absolutely tight either when the gas is turned off or on (thereby doing away with any leakage of gas), as it is necessary to give the thumb-leaf

an upward or a longitudinal movement before it can be turned so as to turn the gas on. In the safety or shut-off position, the thumb-leaf may be turned as much as desired without turning on the gas in the least.



The Hasty Company's Safety Gas-Cock.

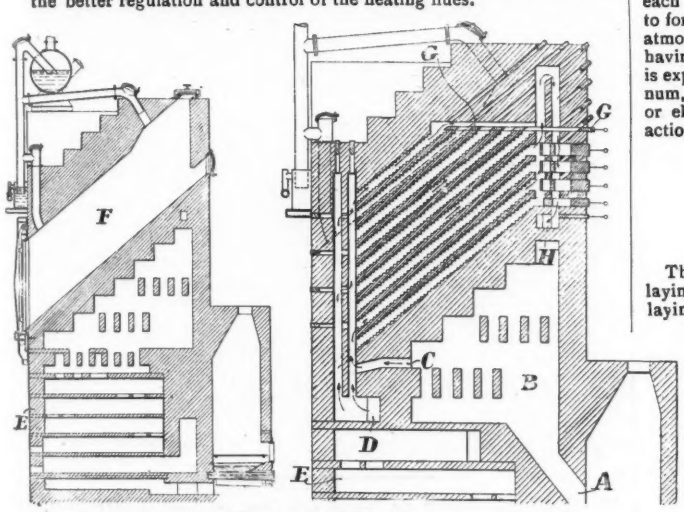
The patentee points out that with ordinary gas-cocks, if the parts are tightened up so as to prevent leakage, they soon wear and become loose, or else the turning on and off of the gas loosens the parts and produces leakage. In the gas-cock shown, there is no chance of a leakage at the top of the valve when the latter is open, if the cap is properly screwed down, or at the bottom of the valve if the packing at the lower portion is in proper shape. The uniform spring pressure on the plunger prevents the tapered portion of it from wearing in the valve-seat and thus becoming loose, as it would do if tightened up by the ordinary screw.

Retort Furnaces.

BRÖKER, H., of Hamburg.

No. 19,419; Aug. 24, 1909.

These retort-furnaces are of the kind in which longitudinal superposed heating flues are provided adjacent to the gasifying chambers to ensure the uniform heating of the side walls of the chambers, and the better regulation and control of the heating flues.



Broker's Retort Furnaces.

In the retort-furnace illustrated, the heat from the generator passes through the flue-conduit A, the chamber B, and the flue C upwards, in order to combine and burn, in the vertical flues, with the heated air coming from the flue D of the regenerator E. In front of the generator flues, arranged at both sides of each gasifying chamber F, are flues separated from the generator flues by a partition provided with perforations, and connected to the air supply flue D, so as to supply further quantities of air at different levels to the heating gases on rising.

The upper heating gas-flues may be entirely or partly closed by means of a grate valve G adjustable in the horizontal flue shown. The grate valve is adjustable from the charging side of the furnace.

The lower heating gas-flues are shut off from the transverse flue H, leading to the discharge flue, by means of a damming wall or baffle (so as to prevent any excessive draught from acting on them), perforated and used for guiding the valves by means of which the bottom heating gas-flues can be closed singly as required. These valves are perforated in such a manner that, even when one of them is moved to close the corresponding heating flue, the escape of the heating gas from the other flues upwards in the direction of the arrow is not prevented.

The cross section of each of the gasifying chambers F is preferably reduced in the direction of the flow of the heating gases—that is to say, in the construction illustrated, from below upwards. This decrease in capacity is desirable, on account of the fact that the temperature of the heating gases in the flues naturally decreases as the gases approach the outlet.

Mantles for Incandescent Gas-Lamps.

BLOXAM, A. G.; a communication from Sparlicht G.m.b.H., of Remscheid, Germany.

No. 22,703; Oct. 5, 1909.

Attempts have been made, the patentees remark, to provide incandescent mantles with an external retaining rib; and for this purpose, asbestos threads, platinum threads, or reinforced cotton or other threads (prepared by soaking in solutions, such as silicic acid and its combinations, which, when exposed to high temperatures, change into a vitrified or solid fire-resisting condition) have been used. Thick asbestos threads placed in the light emitting web or woven in with it, and reinforced cotton threads, "leave dark hues in the glowing mantle which absorb a great deal of the light." Besides this, "owing to the intense heat these threads are, generally speaking, far from being very durable."

According to the present invention, threads of quartz or other similar vitreous substance which melts only with difficulty is used to provide an outward strengthening for the mantle. The vitreous substance, however, must be such that the threads do not melt in the bunsen flame usually employed for incandescent lamps; but it does not matter if they become soft, owing to the heat, provided that they are properly fixed.

The quartz threads are placed round the mantle in separate single or multiplex threads and then connected with the retaining ring. Or a network is formed of the strengthening threads which fits as close as possible to the mantle. By carefully handling the mantle the strengthening network may be woven round it. A good form of retaining network is produced by simply inter-crossing threads in such a manner that a certain number of threads emanating from the top of the mantle pass spirally to the right; the rest going to the left. Each thread then goes alternately over and under the threads crossing it, so that a pattern after the mat pattern is obtained—any kinking of the thread being thus prevented, and only slight bends being present. Such a network can easily be made to fit the form of the incinerated mantle.

Vacuum and Pressure Gauges.

SIMMANCE, J. F., of Westminster Palace Gardens, S.W.; and ABADY, J., of Fountain Court, Temple, W.C.

No. 27,450; Nov. 25, 1909.

This invention relates to gauges of the aneroid barometer type—that is, of the type in which the difference of pressure of the gas inside a flexible metallic box and of the gas outside the box is caused to produce a movement of one part relative the other, which movement is transmitted to an indicating hand or pointer moving over a dial. The invention consists in, and is restricted to, the use of composite discs, each made from two sheets of metal united together face to face, so as to form one composite corrugated disc. The outer sheet exposed to the atmosphere is of steel, copper, bronze, German silver, or other material having the necessary strength and elasticity. The inner sheet, which is exposed to the gas or liquid, may be of lead, tin, silver, gold, platinum, or other material, selected not on account of its hardness, strength, or elasticity, but solely owing to its properties in resisting chemical action by the particular gas or liquid for which the gauge is designed.

Laying Underground Pipes.

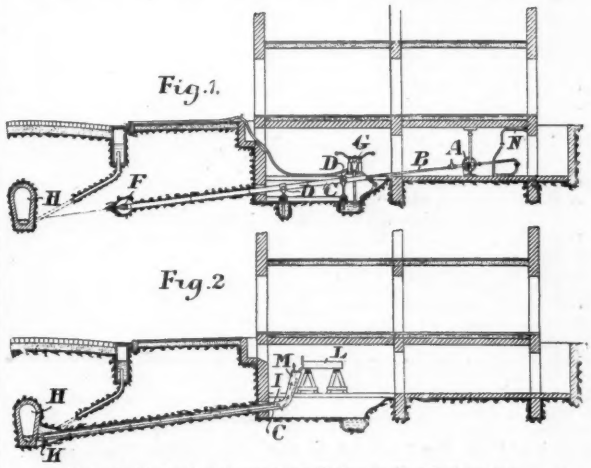
KOEPE, A., of Erkelenz, Germany.

No. 24,473; Oct. 25, 1909.

This invention is applicable for a variety of purposes—such as the laying of underground take-off pipes from houses to street mains, the laying of pipes beneath street surfaces, and so on; and its object is to allow the laying of such underground pipes and connections without sinking any holes, and to enable connections to be made to existing conduits without requiring to sink a hole at the connecting point.

The invention consists primarily in boring out a hole larger than the pipe or connecting piece to be laid and filling the space between the connecting piece and the holes of the boring with cement. A lining pipe is preferably forced into the boring immediately behind the drill; a convenient method being to arrange the drill to draw the lining pipe into the hole along with itself. Devices for this purpose are known.

The cross sections shown are through the cellar of a house and part of the underground work of a street, in order to illustrate the method of laying a connecting pipe from the house to an existing street-main



Koepe's Method of Connecting Mains to House Serv ces.

In fig. 1, a rock drill has its rod passing through a tube B; the drill driving mechanism A being arranged to drive a drill F. The tube B is arranged to pass through a lining tube C, which is guided at D. The apparatus is shown as boring a connecting channel from the cellar of a

house to an underground street-main H. Water from a connection N is passed through the tube B to the drill; and this water, together with the material removed by the drill, passes through the annular space between the tube B and the lining tube C. [Such forms of drills are well known and need no further description.] The water and material issuing from the upper end of the tube C is removed by a pump G. The connecting hole is bored up to the exterior of the street-main as shown in fig. 2. During boring, the tube C is preferably drawn in with the head of the rock drill (in the manner well known). The end of the connecting hole near the street-main is preferably widened as at K, fig. 2. The connecting pipe I is now inserted and supported centrally within the tube C; a funnel M being fixed to the end of it, and cement inserted from a trough or holder L. The funnel is then removed, and a drill passed through the pipe I to bore through the wall of the main. By providing a widened part K on the end of the connecting hole, a much larger gripping surface is provided between the connecting pipe and the conduit, while there is no necessity to sink a hole at the connecting point between the pipe and the main.

Purification of Gas.

CHANDLER, S. B., of Streatham, S.W.

No. 214; Jan. 4, 1910.

This invention was described and illustrated last week, p. 26.

APPLICATIONS FOR LETTERS PATENT.

7651.—WILLIAMS, G. A., "Gas-regulator." March 29.
7703.—RICHARDSON, H., "Mantles." March 30.
7704.—BENNINGHOFF, C., and the firm of AUGUST KLÖNNE, "Chamber and retort furnaces." March 30.
7717.—FRANKS, E. A., "Gas and water mains." March 30.
7727.—MACKAY, J., and ANDERSON, J., "Control of gas or like systems or burners." March 30.
7746.—SAUER, F., "Producing hydrogen gas." March 30.
7759.—PACE, P. C., "Manufacture of air gas." March 30.
7766.—FABRY, R., "Recovering ammonia direct from coal gas." March 31.
7786.—DOHERTY, H. L., "Improvement in processes of treating combustible gases." March 31.
7794.—HARRIS, H. W., "Gas valves or cocks." March 31.
7813.—WATKIN, H., "Pyrometers." March 31.
7845.—WHITE, C., "Gas-engines." March 31.
7904.—CARTON UND FALTSCHACHTELFABRIK MAX WOLFF, "Package for mantles." April 1.
7909.—GRIFFITHS, R. A., and GILBART, W. P., "Regulators for coal gas or other gases." April 1.
7915.—BROUGHAM, F. J., "Removing tar from coal gases." A communication from Solvay et Cie. April 1.
7919.—WOODALL, H. W., and DUCKHAM, A. M'D., "Continuously working vertical gas-retorts." April 1.
7925.—ANDERSON, D., "Gas-lamps." April 1.
7944.—DICKIN, N., "Gas-irons." April 1.
7947.—MASTERMAN, C. E., "Receptacles for mantles." April 1.
7951.—LAMKIN, A. E., and HUNTER, L., "Electrical ignition of gas." April 1.
7967.—TURNER, J. H., "Mantles." April 2.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Sulphur Purification.

SIR,—In reference to your notice of the paper, on "Some Points in the Purification of Gas from Sulphur," by Messrs. R. Ross, F.I.C., F.C.S., and J. Race, A.I.C. [p. 41 of "JOURNAL" for April 5], I have read with great interest the account of their experiments on the estimation of H_2S by means of iodine, and especially the discrepancy they found to be due to another constituent of the gas.

I have for some time been devising a process for the estimation of CS_2 and H_2S in ordinary coal gas by means of iodine, to replace the old and inefficient lead sulphide method, for controlling the working of the purifiers; and, as far as total sulphur compounds are concerned, the estimation is simple, rapid, and accurate. But, in endeavouring to apply the process to the estimation of H_2S, I met with the same difficulty as the authors of the above paper—*i.e.*, there was an absorption of iodine on a test with "clean gas."

My investigations in the matter have led me to the conclusion that this absorption is due almost entirely, if not wholly, to HCN; and a series of comparative estimations with a standard test are now being carried out to prove the point.

A complete description of the process will shortly be given in the "JOURNAL;" and if HCN be proved to be the only other reacting constituent, it should be possible to embody its estimation by the same apparatus.

C. WINTHROPE SOMERVILLE.

South Metropolitan Gas Company, Bankside, S.E., April 8, 1910.

Yield of Gas in Vertical Retort Systems Compared.

SIR,—Mr. W. R Herring, in his interesting communication to the informal meeting of Scottish Gas Managers, on the subject of vertical retorts, is reported to have said that in his opinion the higher yield per ton from these as compared with horizontals is due partly to the absence of the hydraulic main. May I point out that this cannot apply to the Dessau verticals, because these are invariably worked with the hydraulic main, while the results obtained from them compare favourably with those obtained from any other system.

Take, for example, the multiples derived from the figures given in the recent report of the Bradford Corporation Gas Sub-Committee, which are as under.

	Gas per Ton. Cubic Feet.	Candle Power.	Multiples.
Sunderland verticals	12,028	17½	210,490
St. Helens (Glover-West).	12,400	16	198,400
Bournemouth (Woodall-Duckham)	14,000	14	196,000

Your readers are doubtless aware that the Sunderland test which furnished the above figures was made for his Directors by the Company's Engineer, Mr. C. Dru Drury, with the second-class unscreened Durham coal in ordinary use at the works.

C. HOLMES HUNT, Secretary,
Vertical Gas Retort Syndicate.

17, *Victoria Street, S.W., April 9, 1910.*

Direct Sulphate of Ammonia Manufacture.

SIR,—Owing to great pressure of work, I have been unable up to now to reply to Mr. G. Stanley Cooper's answer, in the "JOURNAL" for the 15th ult., to my statement *re* the absence of tar in sulphate made by the Otto-Hilgenstock recovery process.

Mr. Cooper suggests in his letter that if I could give the results of a large number of analyses, my results would be more "convincing." He also adds that "while one crystal may be perfectly pure, another might be found to contain a moderate amount of impurities." The sample to which I referred was taken while on a tour of inspection through Westphalia last October, by my Assistant, Mr. G. L. Hudspeth, from a bulk lot of more than 100 tons at the Zeche Vondern plant. For the rest, I am not likely to impose upon yourself or your readers the analysis of a single crystal!

As regards the estimation of tar in sulphate, the method I employ is to shake up 10 grammes with 50 c.c. of chloroform, which wholly dissolves any tarry bodies that may be present; giving a faintly brown solution, which may then be calorimetrically compared with similar solutions from other makes of sulphate. Apart from this, however, the bare colour of the sulphate itself is a sufficient guide in forming an opinion on freedom from tar or otherwise. Concerning the presence of sulphur in direct-recovery sulphate, the sample on which I based my statement was completely soluble in water. Having regard to the fact that sulphur is insoluble, I need not say any more.

ERNEST BURY.

Brackley Coke Works, Little Hulton, April 4, 1910.

Coke-Oven Gas Schemes.

SIR,—With reference to your editorial notice of the Brackley coke-oven gas scheme, it may be thought by your readers that this is the first public supply of such gas in this country. This is, however, not the case, though hitherto it has not been found necessary to obtain parliamentary powers in the matter.

The Parish of Canklow has been supplied for more than five years with gas from 65 Simon-Carvès ovens, erected at the works of Messrs. J. Brown and Co., Limited, of Rotherham; the quantity of gas supplied per day being about 50,000 cubic feet.

Since its inception, the supply has been regular, and has given the utmost satisfaction; and the majority of the users are probably not aware that it is coke-oven gas they are burning.

In justice to one of the earliest, if not the first, works in this country supplying coke-oven gas for domestic lighting, I venture to hope that this note will warrant inclusion in your pages.

H. W. SEYMOUR.

Victoria Chambers, Leeds, April 7, 1910.

Mr. Grafton's Paper on "Gas Combustion"—A Correction.

Mr. Walter Grafton writes to point out that, while the burners illustrated on p. 42 of the last number of the "JOURNAL" are properly described in the lines beneath them, the numbers do not agree with the figure references in the paper, a type-written copy of which was supplied to us. Fig. 1 is correct; but the other references in the text should be altered as follows: Figs. 2 and 3 (in line 8 of the lower half of the second column of p. 42) should be figs. 3 and 4; fig. 4, referred to later, should be fig. 5; fig. 5 should be fig. 2; and figs. 6 and 7 should be transposed—the former and not the latter being the "Universal" 24-hole argand burner mentioned in the text. Readers of the paper probably noted at the time, and allowed for, the alterations now pointed out.

Gas v. Electricity for West-End Lighting.—The substitution of gas for electric light in Regent Street, Pall Mall, Piccadilly, and the neighbourhood, was considered at a meeting of leading Regent Street tradesmen at the Café Royal last Friday; and the Westminster City Council are to be petitioned to postpone acceptance of a gas contract until the matter has been fully considered by the ratepayers of these thoroughfares.

Salford Corporation Coal Contracts.—The Salford Town Council at last Wednesday's meeting approved of the following minute passed by the General Purposes Committee: "That the Gas Committee be instructed to advertise for fresh tenders for the supply of coal and cannel required at the several gas-works during the ensuing twelve months, with an intimation that the lowest price must be quoted, and that no reduction or rebate will be expected." At a meeting of the Gas Committee held previously, tenders for coal and cannel were considered, and also the financial effect on the gas undertaking of the resolution passed by the Council on the 7th of July last year, directing that the prices paid should be published on the Council's *agenda*. It was decided that the Mayor should be requested to call a meeting of the General Purposes Committee to review the situation with regard to the tendered prices for coal and cannel.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bill brought from the Commons, read the first time, and referred to the Examiners: Brighton and Hove Gas Bill.

Bills read the third time and passed: Gowerton Gas Bill, Southend Water Bill.

The Aberdeen Corporation Water Bill has been read a second time and referred to a Select Committee, consisting of Lord Gorell (Chairman), the Earl of Stradbroke, Lord Sackville, Lord Deramore, and Lord Dawnay, who commenced sitting last Thursday.

Lord Sandys and Lord Templemore have replaced Lord St. Levan and Lord Blyth as members of the Select Committee on the Gas Companies (Standard Burner) Bills.

The Lord Chairman of Committees informed the House last Wednesday that the promoters of the Ammanford Gas Bill did not intend to proceed further with the Bill.

Lord Wemyss gave notice last week that he would call the attention of the House to the following resolution, which prior to the late General Election stood in his name, and to the important public bodies that approve of it: "That, in the opinion of this House, it would be for the public good that important trading and other representative societies should each name three members of the existing peerage in the current and each succeeding Parliament to speak and act on behalf of such societies on all questions in which they are interested; and that the names of the Peers so nominated be entered in the Journals of the House." Among the approving bodies are the Gas Companies' Protection Association, the Junior Institution of Engineers, the Society of Engineers (Incorporated), the Surveyors' Institution, the Machinery Users' Association, the Employers' Parliamentary Council, representing thirty central associations connected with the chief industries of the United Kingdom, and the London Chamber of Commerce.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills brought from the Lords, read the first time, and referred to the Examiners: Gowerton Gas Bill, Southend Water Bill.

Lords Bills read a second time and committed: Farnham Gas and Electricity Bill, Wicklow Gas Bill.

Bills reported: Little Hulton Urban District Council Bill, Mallow Gas Bill [parties do not proceed], Mallow Urban District Gas Bill, Pontypridd Water Bill.

Bills read the third time and passed: Brighton and Hove Gas Bill, East Grinstead Gas and Water Bill.

The Standing Orders Committee reported on Tuesday that in the case of the application of the Cudworth Urban District Council for leave to deposit a petition for a Bill, to which reference was made last week, the Standing Orders ought not to be dispensed with; but that the Glasgow Corporation should be allowed to insert in their Bill the additional provision relating to the acquisition of the undertaking of the Baillieston Gas Company, if the Select Committee on the Bill think fit. A similar decision was subsequently come to by the Standing Orders Committee of the House of Lords.

Last Wednesday, the House expressed concurrence with the Lords' resolution as to referring the Water Supplies Protection Bill to a Joint Committee of the two Houses.

Last Tuesday, Mr. J. D. Rees (Montgomery) asked the President of the Local Government Board whether he had in contemplation any scheme for the improvement of sanitation and water supply in villages in Wales. Mr. Burns, in reply, said it was not the province of the Board to make such schemes. Under the Public Health Act and other Acts, the necessary powers for these purposes were vested in the urban and rural district councils. The Board had granted many loans for such improvements in villages in Wales, and applications for sanction to further loans were under consideration. The Board were doing what they could to urge and encourage local authorities to carry out such schemes, where they appeared to be necessary or desirable.

GAS COMPANIES (STANDARD BURNER) (No. 1) BILL.

House of Lords Committee.—Thursday, April 7.

(*Before Lord* RITCHIE, *Chairman, Lord* WILLOUGHBY DE BROKE, *Lord* TEMPLEMORE, *Lord* SANDYS, *and Lord* VIVIAN.)

This Bill is promoted with the object of providing, in the case of certain gas companies, for the adoption of the "Metropolitan" argand burner No. 2 as a standard burner, in substitution for the various burners now in use for the official testing of the illuminating power of the gas supplied by them, and for other purposes. It is linked with two other Bills (known as Nos. 2 and 3); the promoters of the three Bills being the following Gas Companies:

No. 1 BILL: Brentford, Croydon, Hastings and St. Leonards, Ilford, Liverpool United, Maidenhead, Scarborough, Swansea, Torquay, and Wandsworth and Putney Gas Companies.

No. 2 BILL: Berkhampstead, Bournemouth, British (in respect of their Staffordshire Potteries, Trowbridge, and Holywell Stations), Cambridge University and Town, Chigwell, Loughton, and Woodford, Faversham, Harrow and Stanmore, Hatfield, Hemel Hempstead District, Herne Bay, Newmarket, Ormskirk, Prescot, Radcliffe and Pilkington, Reading, Shrewsbury, Tunbridge Wells, Waltham Abbey and Cheshunt, West Kent, and Worthing Gas Companies.

No. 3 BILL: Aberdare and Aberaman Consumers', Bath, Exeter, Gloucester, Godalming, Guildford, Hampton Court, Ipswich, Mid-Kent, Newport (Mon.), Plymouth and Stonehouse, Richmond, Romford, Southampton, Walton-on-Thames and Weybridge, Weston-super-Mare, and Wolverhampton Gas Companies.

The Brentford, Wandsworth and Putney, Gloucester, and Newport Companies, after being among the original promoters, withdrew from the Bill.

For the promoters, Mr. J. D. FITZGERALD, K.C., Mr. HONORATUS LLOYD, K.C., Mr. HUTCHINSON, and Mr. A. M. PADDON appeared. Various local authorities, who were petitioners in opposition, were represented by Mr. RAM, K.C., Mr. J. G. TALBOT, K.C., and Mr. COURTHOPE MUNROE.

Mr. FITZGERALD, in opening for the promoters, said there was one question, and one only, raised by each of the three Bills, and that was the adoption, for the purpose of testing gas, of the "Metropolitan" argand No. 2 burner. These Bills were promoted by a number of gas companies, who might have promoted either one Bill, or 47 different Bills; but after unofficially consulting the Speaker's Counsel, they determined to adopt his advice, and split up the Bills into three. In the first Bill, they put companies as promoters of different descriptions; so that every question that was likely to arise in the course of the discussion could be raised on the first Bill. He asked the Committee, therefore, to decide the matter of principle on the first Bill; and if any question of detail remained, it could properly be raised by any of the local authorities who were opposing Bills Nos. 2 and 3. The local authorities who were opposing the Bills had adopted the very reasonable course of uniting their opposition, recognizing that it was substantially the same. Bill No. 1 was promoted by eight companies. The "Metropolitan" No. 2 burner was prescribed some five years ago by the London Gas Referees, under their parliamentary powers, for the purpose of testing the illuminating power of gas by the Metropolitan Gas Companies. They had prescribed it as the best burner for testing the gas supplied in the Metropolis; and, accordingly, it was used by the Metropolitan Gas Companies. Their example had been followed by eighty gas companies and local authorities. The Board of Trade, who were the Public Department in whom the supervision of gas supply remained, had also adopted the No. 2 burner as the best one for testing illuminating power; and in all Provisional Orders that were granted by the Board of Trade at the present time the new burner was inserted. Finally, the authorities of the House of Lords, in the Model Clauses which they issued every year, had adopted the burner as the one best suited for testing gas. So the result of five years' experience was that burner No. 2 was admittedly the best burner at present known for testing purposes. The companies who were promoting this Bill desired to avail themselves of the modern practice, and to bring themselves into line with the London Gas Companies and the other eighty authorities he had mentioned. There could be no real question that the No. 1 burner was not a suitable one for testing gas of lower than 16-candle power; and as long ago as 1890 Mr. Vernon Harcourt, the Senior Gas Referee for London, stated publicly that, by the use of the No. 1 burner, any deficiencies of the gas were greatly exaggerated. Counsel proceeded to give an outline of the revolution produced by the introduction of the incandescent burner, and the resulting alteration in the practice of Parliament as to the illuminating power. He dwelt on the proceedings of the Board of Trade Departmental Committee in 1904, who recognized the defects of the No. 1 burner for testing 14-candle power gas, and pointed out that when the No. 2 burner was invented it overcame the difficulty, because it was equally suitable for testing 16-candle power or 14-candle power, or any other quality of gas. Hitherto every company or corporation who desired to have this burner was required to promote a separate Bill or Provisional Order; but the companies who promoted this Bill thought it would be better, instead of waiting until the time when it would be necessary for them to go to Parliament for general powers, to promote a Joint Bill for the purpose. He submitted that there ought to be some finality in a matter of this kind, especially when Parliament had over and over again given leave to use this burner. So far as he knew, there was no case where this leave had been refused. In the present instance, although he knew there were some gentlemen connected with the gas industry who always disagreed with other people, and who thought that the No. 2 burner was not a good one, nevertheless he did not anticipate that their opponents would really suggest that the No. 2 burner was not the best for testing the illuminating power. It really was too late to contest this after what had happened within the last five years. But whenever a gas company came before Parliament, there was always an attempt to squeeze a little out of it. In this case, a good many of the local authorities in the districts of these companies, being well advised, had not sought to oppose the adoption of the burner. But what he anticipated Mr. Ram would say was that the gas companies, by relieving themselves from the use of an unsuitable burner, were getting an advantage. They would say that, though the companies were required to provide only 14-candle power gas, owing to the defective burner for testing, they had in fact had to supply 15-candle or 15½-candle gas; and that if they were relieved from this disadvantage, they should reduce the price of gas. In one sense this was perfectly true; but the answer to it was this, that it was a disadvantage from which the company ought never to have suffered, because it was clearly the intention of Parliament, as shown in the London Gas Act, 1905, that the burner to be used for testing should be the most suitable one for obtaining the full illuminating power, provided it was a burner that was practicable for use by ordinary consumers. The "Metropolitan" No. 2 burner answered these conditions. Further, where there was any improvement in the manufacture of gas, it was the consumer who almost always got the bulk of the advantage. In the eighty cases in which Parliament had allowed this burner to be substituted for the old one, there was only one instance in which any alteration was consequently made in the price of gas. Certain of these companies were under the sliding-scale; and where there was any increase in the dividend, the consumer got a corresponding reduction in price. There were three maximum dividend companies among the promoters of the first Bill, all of whom were paying their maximum dividend. Therefore every advantage which resulted from the use of this improved burner would go, not to the shareholders, but to the consumers. In these circumstances, it was preposterous to ask that, in addition to getting the whole of the advantage from the use of the proposed burner, they

should get a reduction in price as well. The saving per candle was about ⅜d. per 1000 cubic feet. The position of the companies was that they were now bound to supply 14-candle power gas; but, by reason of the defective burner in use, they were, in fact, supplying 16-candle gas. They would therefore save ⅜d. per 1000 cubic feet by the adoption of the new burner. Of this ⅜d., four-fifths would go to the consumer, if he were served by a sliding-scale company; and if it were a maximum-price company, paying the maximum dividend, the consumer would get the whole advantage. The regulations in the schedule to the Bill went beyond the provisions in the Model Bill; but they went beyond it with the intention of making the test more perfect, so that they were not disadvantageous to the consumer. Some of the local authorities who were petitioning against the Bill had objected to this difference; and if their objection were insisted upon, rather than have a contest on the question, he was perfectly prepared to accept the provisions of the Model Bill. The question of a calorific test did not properly arise on this Bill; but if it were contended that the alteration of the testing burner involved this question, he would reply that there was not a single case where Parliament had placed the test for calorific value, in addition to the test for illuminating power, on an unwilling company. If the time ever came when Parliament should do away with the test for illuminating power, and substitute the test for calorific power, he had no doubt it would be done by a General Act, like the Gas-Works Clauses Act. But in the present state of knowledge, in which it was hardly possible to frame a calorific power test that would be suitable for a large number of companies, it would be perfectly unreasonable to make an ordinary gas company have both tests.

Mr. RAM said it would not be denied that this application was absolutely unique.

Mr. FITZGERALD replied No. A similar question arose about sulphur compounds a few years ago; and then 17 companies combined for the purpose of getting rid of the provisions in their respective Acts relating to sulphur compounds. The Bill was passed by Parliament; and this Bill went on exactly the same lines. Following that, the next session there was another Bill dealing with 12 companies.

Mr. RAM replied that these Bills dealt with a matter which was identical in the circumstances of every one of the companies affected. The application in this case was highly inconvenient, because it sought, in circumstances which differed with every company, to apply the same method of testing to all the companies. It would be impossible for the Committee to say what ought to be done in all these cases to give to the consumer the concurrent advantage to meet the change made. Of the companies affected, 21 had a maximum price, and 26 a standard price; and the candle power presented varied between 14 and 16. In one case, that of Liverpool, it was 20 candles; but the Bill proposed that a hard-and-fast rule should be applied to all the companies. The test burners used also varied greatly. Twenty-three companies had the argand No. 1 and 15-candle power; thirteen companies had the No. 1 and 14-candle power; four of them had the argand 15-hole burner, which was quite a different thing; and there were other variations. If they proposed to institute entirely new tests in all of these instances, without inquiry into each individual case, they must inflict great injury on the consumers. Moreover, the Model Bill prescribed four tests—the candle power, the burner, the photometer, and the standard light. It was only by taking all four tests that they could arrive at what the light really was; but the promoters proposed to take only one. It was not denied by the companies that the adoption of the new burner would be an advantage to them—indeed, in the Brighton and Hove case, this session, a reduction of 1d. per 1000 was made as compensation to the consumers for the change. The present Bill was really a misuse, if not an abuse, of the processes of Parliamentary Committees; and it ought not to proceed.

Mr. FITZGERALD said it was not the case that with each one of these companies a separate question arose. Out of the 47 companies, 40 had the No. 1 burner; and in each case what they asked was to substitute the No. 2 burner.

The room having been cleared in order that the Committee might consider this point,

The CHAIRMAN subsequently announced that they had decided to take the Bill as presented to them, and to hear the evidence.

Mr. *Charles Carpenter*, the Chairman of the South Metropolitan Gas Company, was the first witness called. He said the defect of the argand No. 1 burner arose from the fact that, if the gas did not happen to be of the particular value for which the burner was made, far too much air went up the chimney and over-burnt the flame. To meet this defect, he devised the No. 2 burner. It was the outcome of the examination of Professor Harcourt before a Parliamentary Committee by the Duke of Wellington. The Duke had given considerable attention to the subject, and had come to the conclusion that it was necessary to obviate the defect of the old burner by having some method of adjusting the air supply. The main point of difference between the No. 2 and the No. 1 burner was that the former had an adjustment for regulating the in-flow of air. The damper was screwed up or down, as the case might be, and thus increased or reduced the supply of air. With regard to the claim for a reduction in the price of gas, he would point out that the position of gas companies was very different from what it was 25 years ago. It was now a hand-to-hand fight between themselves and the electricians; and until they had the condition of affairs which the new burner provided, they were fighting with one hand tied behind their backs. They had to spend very large sums of money in "adulterating" the gas—that was, they had to enrich it with added material in the form of cannel, oil, or spirit, in order to make it pass the test. The gas companies existed because they could supply light at a cheaper rate than the electrical companies; and they were enabled to do so in London, at any rate to a great extent, by the freedom which the altered method of testing had given them. This had enabled the companies in many cases to dispense with artificial enrichment; and in other cases the necessity for enrichment was not so great as it was. The general effect of the improvement had been beneficial to the consumer. To-day they had to do a great deal for the consumer to induce him to take gas. They had to give him free service in many ways. They put his pipes, his burners, and his gas-fires in order for him, and did all that was necessary to make him a contented consumer. All this had to be paid for, and, compared with 25 years ago, it was quite possible that the value of these services to the consumer reached a figure equal to 1d. or 1½d. per 1000 cubic feet on the price of gas. Although this was tantamount to a reduction in price, they got no readjustment of the sliding-scale in recompense for their increased expenditure. If they reduced their gas 1d. per 1000 cubic feet, his Company were allowed, under the sliding-scale, 2s. 8d. in the pound more dividend; but if they gave the consumer a free service, which was equivalent to 1d., they got no extra dividend. The position of gas companies had also been altered by the rise in the price of coal. All authorities on the subject had stated that, as the result of the Eight Hours Act, there must be a permanent increase in coal prices.

In cross-examination, witness said he would agree that any burner which was not suitable for the lighting of a room was not suitable for a test burner. He did not imagine that there was a single No. 2 burner in use by the consumers.

Mr. RAM: I thought that would be your answer.

Witness: I am not going to leave it there. What is true of the No. 2 is equally true of the No. 1 argand. No. 1 was commonly in use when gas lighting was done by means of the self-luminosity of the gas. With the change to incandescent burners, it fell out of use; but if the lighting had to be done by self-luminosity, the No. 2 burner would be as common as the No. 1 was in the old days. The No. 2 burner gives truer results to the company using it. Both the company and the consumer get an advantage from it.

Is not there a further advantage?—I confess I do not know what you are driving at. Will you suggest another advantage?

I suggest that what you are supplying by that burner to the public is an article less good than he is entitled to?—Less good for some purposes perhaps; but for some purposes it is even better.

For what purposes is the value depreciated?—If the gas is used in a flat-flame burner. By most incandescent burners the consumer gets as good or even better value.

Is the difference between the "Metropolitan" No. 2 and the No. 1 argand practically 2 candles?—Under certain circumstances it would be. There is a loss to the consumer of about one candle in theory, but not in practice. The same argument was put forward when the South Metropolitan Company reduced their illuminating power from 16 candles to 14 candles. It was prophesied that, as a result, the consumer would burn 40 per cent. more gas. We found, in fact, that, from the time the change was made, consumers burnt less gas than before.

Mr. *W. J. Atkinson Butterfield* expressed the opinion that it would be beneficial to have uniformity in the matter of testing burners, and to bring the provincial companies in this regard into line with the London companies.

Mr. *W. C. Young*, the Gas Examiner to the City of London, also said he was strongly in favour of the substitution of this new burner for testing purposes.

Mr. *J. W. Helps* said the old burner was unfair to the companies, and it would be an advantage to the consumer to get rid of it, and to substitute the more modern burner.

In cross-examination, witness said it seemed to him that the users of flat-flame burners were so few, and they were able at such small expense to substitute incandescent gas-burners, which would greatly reduce their gas bills, that they were not worthy of consideration. It was possible that flat-flame burners would not give so good a light, but that only applied to certain kinds of flat-flame burners. Other users of flat-flame burners would not be prejudiced.

Mr. *Edward Allen*, the Engineer to the Liverpool Gas Company, said his Company at present tested their gas with flat-flame burners, using 20-candle power gas; but that burner was not fair to the Company, and they desired to adopt the new burner.

In cross-examination, witness said he was no longer an advocate of high-grade gas. He was now satisfied, after careful observations, that, in respect to incandescent burners, low-grade gas was the most suitable. In respect to heating, also, he was convinced that low-grade gas would be better. There were 60,000 slot-meters in Liverpool; a great proportion of these consumers using flat-flame burners. But although this was a large number, the users of these meters represented usually only one burner.

Friday, April 8.

When the Committee met this morning, evidence was given by

Mr. *Corbet Woodall*. He said the companies would reap some advantage from the adoption of the approved burner, and the consumers would benefit from any saving there might be in the cost of manufacture. In the case of a company having a maximum price and a maximum dividend, any saving effected would go fully to the advantage of the consumer in the shape of a reduction in the price of gas; and in the case of a sliding-scale company, the effect would be to give the consumer, on an average, four-fifths or five-sixths of the saving. The effect of making an alteration in the price would be to hurt the sliding-scale company to the extent of the dividends they would be able to pay; but it would not affect the maximum-price company at all. The interest of the maximum-price company was to supply gas at as cheap a rate as it could, because of competition. He did not agree with the opponents of the Bill that there should be a reduction in the standard price. On other occasions he had expressed his strong antipathy to a reduction of the standard price fixed by Parliament, on the ground that the capital had been subscribed on the strength of the standard price and standard dividend. The conditions, if the standard price were reduced, under which a company would be able to supply would be affected. It was reasonable to suppose that the greater the disparity between the selling price and the standard price, the greater being the security of obtaining the dividends, the higher would be the premium. The consumer benefited by getting a larger sum of money, and the price of gas would be lower. He had not found any objection among local authorities to adopt a more scientific burner; and the consumer could not be prejudiced in any way. They were prepared to take either the calorific test or the illuminating test; but it would be a mistake to have the two, because there was a great deal of dispute about tests, and the two did

not necessarily go together. Certain circumstances fitted the one test that would not fit the other. In the present case, the variation in the illuminating power was not necessarily accompanied by a variation in the same ratio in the calorific value. There was only one company in existence at present that was subject to a calorific test—namely, the Gaslight and Coke Company. In this case, it was agreed to insert the test in the Bill between the Gas Company and the London County Council. This had not been accompanied with any special inconvenience; but it had been found that when working with a certain illuminating value, the Company were not able to maintain the calorific value specified. It was, however, quite a temporary arrangement; and at the end of three years the Company and the County Council were at liberty to consider the amount of the standard as to calorific power. On the question of the illuminating power and the calorific standard, he said there was no doubt whatever that the calorific standard was by far the more important; but he thought it would be folly, and perhaps even useless, to have the two. The insertion of a calorific standard in the Gaslight and Coke Company's Bill was a matter of agreement between the London County Council and the Company before actually coming to Parliament. It was recognized by the County Council; and the information available was not sufficient upon which to fix a definite calorific standard for all time. It was, in fact, made provisionally for three years.

In reply to Mr. MUNRO, witness said that the calorific value was certainly most important in cases where a great deal of work was done by gas-engines. In Liverpool, the gas was of 20-candle power, and gas-engines were used. As to whether there would be any difference in the results obtained by testing gas with the No. 1 burner and the "Carpenter" burner, he said it all depended on the quality of the gas. With 16-candle power gas, the adoption of the "Carpenter" burner would make but little difference; but if it were 14-candle gas, a very considerable difference would be shown. If gas of 16-candle power were tested with the No. 1 argand, and then with the "Metropolitan" No. 2, it would be possible to show a difference which he would put at half-a-candle. In all cases there was a difference between the results of the two tests—a high-grade gas showing a small difference and a low-grade gas a big difference. If the suggested burner were adopted in the present case, he agreed that they would be selling an article having a different illuminating value for the same price; but the tendency would be to reduce the price. He thought that it was quite a fair proposition.

Mr. MUNRO: If we establish a case to the Committee that you will be selling an inferior article at the same price, ought it not to be referred to somebody to determine the difference?

Witness: I think definitely not. The company, with the object of increasing its business, would supply at the cheapest rate.

Continuing, witness said there would be a saving which, in the first place, would go to the company; and it must be conveyed on to the consumer. The saving that would be effected could not stop in the pockets of the company. He objected to any alteration of the standard price. He did not agree that for every candle less supplied there should be a reduction of ½d. in the standard price.

In answer to Mr. FITZGERALD, witness said that the Liverpool Gas Company were the only company in England who now supplied 20-candle power gas. They were a maximum-price company paying their maximum dividend; and under the gas legislation of the country, any surplus profits they made they were obliged to devote to the reduction of the price of gas.

In answer to a question by the CHAIRMAN, it was stated by Counsel that in the Bill there were four maximum-price companies and four sliding-scale companies; in the three Bills, there were 21 maximum-price and 26 sliding-scale companies.

Mr. *Wm. Cash* said that of late years the cost of distribution had greatly increased, partly on account of the use of gas by small consumers, for whom gas companies had to provide a considerable amount of capital. The companies were also doing much to improve their light, all of which cost money. If gas of less illuminating value were supplied in this case, it would be sold at a less price.

Mr. MUNRO, in reply to the CHAIRMAN, contended that, if the Bill were passed, an inferior gas would be sold for the same price, by reason of which there would be a saving, as a result of which the position of the consumer would be worse and that of the Company better. It was not true to say that the saving to the Company would find its way into the pockets of the consumers.

Evidence was then called in opposition to the Bill.

Mr. *Isaac Carr* said he had carried out a series of tests in order to determine the difference between the existing and the proposed test-burners, and as to the saving to be effected in the process of manufacture by the proposed change of burner. His opinion was that the 20-candle power gas at present supplied by the Liverpool Gas Company was a most valuable asset to the consumers, and any attempt to reduce the standard of illuminating power without a *quid pro quo* equivalent in a reduction of price should be strenuously resisted. To reduce the illuminating power to the extent proposed would adversely affect every type of burner for illuminating purposes—more especially those of the flat-flame type, as well as consumers who used gas for cooking, heating, and motive power purposes. For a number of years the Widnes Corporation had sold gas within the borough at a lower price than any other town; but although the selling price was abnormally low, no attempt had ever been made to reduce the illuminating power. He was of opinion that a reduction of illuminating power was equivalent to an increase in price. He had made numerous experiments to determine the relation of difference in photometrical value between one test-burner and another; and he found that 14-candle gas, as tested with the 15-hole Sugg-Letheby argand, was returned at over 20 candles when tested in the No. 2 "Metropolitan" argand. He also found that gas returned as 14 candles when tested in the No. 2 "Metropolitan" gave a result of 8 candles when tested in the Sugg-Letheby argand. If the 14-candle gas now supplied by the Widnes Corporation was tested in the No. 2 "Metropolitan" argand, it would be returned as 20 candles, or 22 candles if tested by the parliamentary argand. The gas supplied by the Liverpool Company was 20 candles as tested by the No. 7 standard flat-flame test-burner, or an efficiency of 4 candles per cubic foot; but tested in the No. 2 "Metropolitan" argand, it would be returned as 22½ or 23½ candles. The proposal in the Bill was to reduce the illuminating power to 20 candles as tested in the No. 2 "Metropolitan" argand, or nominally no reduction; but there would be an actual reduction of 5 candles, or 25 per cent. In the No. 2 "Metropolitan" argand, 20-candle power gas gave an efficiency of about 3 candles per foot, or an illuminating power of 15 candles when consumed at the rate of 5 cubic feet per hour in the flat-flame burner. From a series of tests carried out at the Liverpool Corporation works on coal gas, he found that the net calorific value of 20 candles in the No. 7 standard flat-flame burner was 680 B.Th.U. Gas showing 20 candles in the No. 2 "Metropolitan" argand and 14·5 candles in the No. 7 standard flat-flame burner gave a net calorific value of 565 B.Th.U., or a loss in calorific value of 3 per cent. per candle. With gas of over 20 candles in the flat-flame burner, an increase of only 2 to 3 candles was obtained by using the No. 2 "Metropolitan" argand; but with gas of 15-candle power in the standard flat-flame burner an increase of about 5 candles, or 25 per cent., was obtained. Therefore, while the gas was styled 20-candle power gas, as at present, the new test-burner device would admit of enormous loss being inflicted on the consumers. It was constantly claimed that illuminating power had no fixed relationship to calorific value. This might, in a measure, be true in comparing certain districts with various coal supplies; but under comparable conditions, there was an undoubted and marked relationship between the two. At a price of 2s. 6d. per 1000 cubic feet, users of gas for cooking, heating, and motive purposes would have to use 15 per cent. more, which would be equivalent to an increase in price of 4½d. per 1000 per cubic feet. As further proof of the necessity for a greater consumption in incandescent burners with low-grade and high-grade gas, he explained to the Committee two incandescent burners where the orifice in the nipples for the low-grade gas were very much larger than those made for the high-grade gas. He had conducted a series of experiments with these burners, and found that, under a pressure of 15·10ths, the orifice in the burner for the low-grade gas passed 3·3 cubic feet per hour; while the burner for the high-grade gas passed 2·3 cubic feet per hour, and at lower pressures the difference was greater. The ordinary consumer was not capable of a skilful manipulation of the burner. Under the proposals in the Bill, there would be a saving to the Company in the reduced cost of raw material, the improvement in the quality of the coke as a result of the disuse of cannel, and the saving of gas that would arise owing to an increased make per ton of coal carbonized, such as would be possible when manufacturing gas of an illuminating power that required little enrichment. The saving in the cost of manufacture by substituting the proposed burner would be 3·85d. per 1000 cubic feet.

Replying to Mr. FITZGERALD, witness said that this was a matter that had never been understood by Parliament. Asked whether he suggested that, in the case of the Liverpool Company, the savings would be misapplied in some way or other, he replied that it was possible with all companies. There should be a provision inserted in the Bill that any saving there might be should be applied to the reduction of the price of gas.

Mr. *J. G. Newbigging*, the Engineer to the Manchester Corporation Gas-Works, said the effect of introducing the new burner would be that the gas companies would be able to distribute gas showing 15 candles in the flat-flame burner as against 20 candles in the "Metropolitan" argand No. 2 burner. The reduction in efficiency was 2 per cent. per candle in an incandescent burner; and in the case of 5 candles, it would mean a reduction in efficiency of 10 per cent. The reduction in the heating value would be 15 per cent.

Replying to Mr. HONORATUS LLOYD, witness said that in Manchester the amount of gas profits which were applied in relief of the rates amounted to between £50,000 and £70,000 per annum. In Manchester, the batswing test was satisfactory for the flat-flame consumer; but he could not advise the adoption of that test to-day. He was not opposed to the use of the burner proposed in the Bill, because he took it that it was the best burner; but in any change that was made in this way, the consumer should get the benefit. He agreed that the No. 1 burner was intended to be the most suitable for obtaining from the gas the greatest amount of light, and that the No. 2 burner was the one that ought to have been invented to comply with the revision of the 1860 Act.

Mr. HONORATUS LLOYD: Since 1860, gas purveyors have had unnecessarily to go to the expense of manufacturing an article higher in value in order to produce the value which was intended; and now that the invention has been found which enables the Act to be complied with, you say the companies should give up entirely to the consumer the benefit they have got?

Witness: The saving in cost should go to the consumers.

Professor *Percy Frankland* said he had made special experiments with Liverpool gas; and he found that, tested with the flat-flame burner, the result was 14·1 candles, with the No. 1 it was 16·3 candles, and with the "Metropolitan" No. 2 19·1 candles. For a reduction of one candle in the illuminating power, there was about 3 per cent. diminution in the calorific power.

Professor *Teed* said the effect of the proposed change would be that the consumer would get less lighting and heating power for the same price. He thought the No. 2 burner was unscientific, and should not be used for testing purposes at all.

Additional evidence on behalf of the opponents was given by Mr. *A. G. Smith*, the Gas Examiner to the Liverpool Corporation, and Professor *F. W. Burstall*.

Monday, April 11.

On the resumption of the proceedings this morning, Mr. Talbot addressed the Committee on behalf of the Mersey Docks and Harbour Board; and evidence was called. He was followed by Mr. Ram, who addressed the Committee on behalf of the joint petitioners against the Bill. After the adjournment, Mr. Honoratus Lloyd summed up for the promoters—making a very powerful criticism of the evidence that had been adduced by the opposition, and pointing out the contradictory nature of much of it. Following his speech, Mr. Carpenter was recalled to the chair, to give some elucidating evidence.

The room was then cleared; and, after very few minutes' deliberation, the Committee found the preamble proved. Clauses will be taken on Wednesday morning. A fuller report will appear next week.

GLASGOW GAS CONSOLIDATION BILL.

House of Commons Committee.—Tuesday, April 5.

(*Before Mr.* MOONEY, *Chairman, Mr.* ESSLEMONT, *Mr.* ELVERSTON, *and Captain* TRYON.)

This Bill, which is to consolidate, with amendments, the Glasgow Gas Acts, from 1869 to 1909, provide for the reduction of the illuminating power of the gas supplied by the Corporation of Glasgow from 16 to 14 candles, and for other purposes, came under consideration to-day.

Mr. BALFOUR BROWNE, K.C., Mr. HONORATUS LLOYD, K.C., and Mr. H. BEVERIDGE appeared for the promoters. The petitioners were represented as follows: Royal Burgh of Rutherglen and Burgh of Pollokshaws, Mr. FREEMAN, K.C., and Mr. T. JONES; Burgh of Clydebank, Mr. FORBES LANKESTER, K.C., and Mr. COLIN SMITH; Burghs of Dumbarton and Milngavie and Baillieston Gas Company, Limited, Mr. BLENNERHASSETT, K.C.; Burgh of Govan, the Hon. J. D. FITZGERALD, K.C., Mr. RAM, K.C., and the Hon. EVAN CHARTERIS; Burgh of Partick, Mr. TALBOT, K.C., and Mr. CLODE; the County Council of Lanark and the District Committees of the Middle and Lower Wards of that County, Lord R. CECIL, K.C., Mr. WILSON, K.C., and Mr. KING; Caledonian Railway Company, Mr. HENDERSON; Busby and District Gas Company, Mr. WILSON, K.C. Counsel was reserved on behalf of the North British Railway Company and the Glasgow and South-Western Railway Company.

Mr. BALFOUR BROWNE, in opening the case, said the objects of the Bill were, first, to consolidate, with certain amendments, the Acts obtained by the Corporation of Glasgow between 1869 and 1890 and others relating to the gas undertaking—the total number being twenty; secondly, to provide for the continuance of the existing gas-works and the manufacture and supply of gas and residual products; thirdly, to fix the price and illuminating power of the gas; and, fourthly, to define the limits of supply of the Corporation for gas purposes, and to divide them into two districts, to be called the city supply district and the supplementary supply districts. In 1869, the Corporation obtained statutory authority to purchase the undertakings of the two Gas Companies who were then supplying Glasgow and a portion of its suburbs; and in connection with this purchase they obtained power to raise a guarantee rate of 6d. in the pound on the annual value within the city. Though the district of supply extended much beyond Glasgow, the guarantee rate could only be levied on the ratepayers within the city. The capital account of the gas undertaking at the present time was £3,841,282, exclusive of annuities of £27,000 and £7762 10s. payable under the original Purchase Act. In 1869, the price charged for gas was 4s. 7d. per 1000 cubic feet, and the illuminating power was 25 candles. In 1882, the latter figure was reduced to 20, and in 1901 to 16. In 1869, the quantity of gas manufactured was 1206 million cubic feet; whereas it was now 6820 millions. After acquiring the gas-works in 1870, the Corporation reduced the price of gas inside the municipal area by 5d. per 1000 cubic feet, and by 2½d. outside. In 1871, the figure was reduced to 4s.; and no difference was made between any of the places within the city supply district, so far as price was concerned. In 1882, when the Corporation were again in Parliament, some of the outside burghs, such as Partick and Govan, thought Glasgow might impose different rates on them from those levied in Glasgow. The Corporation then said they had no intention of making differential rates in respect of people in the same circumstances; and a clause was introduced into the Act of that year to deal with the point. It was true the clause was ambiguous; but it was made perfectly clear by the Bill now before the Committee. The present price of gas was 2s. instead of 4s. 7d.; and, with the exception of certain small districts, the whole of the area outside Glasgow, having regard to the circumstances of supply, now had gas at the same rate as the inside district. Since 1869 the gas undertaking had not been conducted by the Corporation with a view to making large profit, though like other gas suppliers they would have been entitled to do so; the total amount carried from the undertaking to the relief of rates being only £21,000. Last year Birmingham took £71,000 and Manchester £27,000 for the purpose from the gas undertakings. It would be seen, therefore, that Glasgow had been conducting the gas undertaking in the interests of the consumers, and not with a view to obtaining large profits with which to benefit the ratepayers. Glasgow bore all the risk of the concern, including the burden of the annuities and the liability to the guarantee rate; and therefore if there was a profit the ratepayers were entitled to it. The Corporation sought, in this respect, to be left in exactly the same position as they had occupied since 1869; and they asked the Committee to believe that, as in the past so in the future, they would use their power with discretion. In 1876, an Act, applicable only to Scotland, was passed, which, as originally framed, would have enabled any of the police burghs round such a city as Glasgow to establish gas-works with which to supply themselves. Glasgow held that it would be very unfair to allow works to be established in this way in competition with them; and eventually the provisions of the measure were amended, so that, while enabling burghs to supply themselves with gas in cases in which there was no supply under Act of Parliament, they were prohibited from supplying themselves where there was such a supply. In this way Glasgow was protected against the possibility of competition by such burghs as Partick and Govan. The Corporation had acquired several gas undertakings, and were now purchasing that of the Baillieston Gas Company for a sum of £10,000. The Corporation supplied gas over an area of 98 square miles; the district being 15¾ miles across from east to west, and 11¾ miles from north to south. They had obtained twenty different Acts; and it was desirable, for the benefit of everybody—for the city generally and for the consumers individually, who should know, if possible, what was the real law with regard to the supply of gas in Glasgow—that these Acts should be consolidated. This could be done without doing damage to anyone interested in the undertaking. The Secretary for Scotland reported that the Bill, if passed, would effect a material simplification of the local legislation relating to the supply of gas by the Corporation. There were certain additional matters in regard to which Glasgow desired legislation. Clause 27 in the Bill would confer permissive power on the Corporation with reference to the prompt payment of accounts. A similar clause existed in a great number of Acts of Parliament; and it seemed fair that people who paid promptly should derive benefit. By clause 30 it was proposed to reduce the illuminating power of the gas from 16 to 14 candles, the figure at which it now stood in the Acts of the three London Companies. Clause 42, which directed that fittings were not to be subject to distress, was new. So, too, was clause 43, which related to the use of anti-fluctuators for gas-engines. Clause 9, relating to the supply of non-illuminating gas, was taken from the Corporation Act of 1882. When the Corporation obtained power to supply non-illuminating gas, they apparently thought a separate supply of such gas might be given. While no special plant had been erected for the production of this gas, a large amount of it was being supplied for heating and power purposes; and therefore it was desired to retain the powers contained in clause 9. The County Council of Lanark and the District Councils held that as the Bill provided for the Corporation obtaining the consent of the Council of any burgh outside Glasgow before laying pipes for the supply of non-illuminating gas within the burgh, it should also provide for the consent of the County Council being obtained before such pipes were laid in the county area. Clause 9 contained practically merely the same power as the Corporation now possessed, and therefore there was no reason why it should be altered. The prices at present charged for gas were these: For lighting and domestic purposes within the city and the suburbs generally, 2s.; for motive power purposes within the same area, 1s. 8d.; for manufacturing purposes, also within this area, for gas supplied in quantities of not less than 30,000 cubic feet, 2s. 1d., and for quantities above this figure, 1s. 8d.; and for gas supplied to hotels, clubs, and institutions other than for lighting purposes, if less than 100,000 cubic feet, 2s., and if more, 1s. 8d. Within the Milngavie district, 1s. per 1000 cubic feet extra was charged. In 1882, when the Corporation were applying to Parliament, there was some discussion with regard to their power to charge differentially. Doubt arose as to whether they could charge (say) in Govan differently from what they charged in Glasgow; and Counsel for the Corporation said they had no intention of doing any such thing. The scale, however, showed that they really did charge different rates. The person who took a large quantity of gas for power or lighting purposes had the advantage of being charged only 1s. 8d. per 1000 cubic feet. But they treated his competitor, who took as much, in exactly the same way; and they wished to do the same thing in future. It was the custom to differentiate between large and small supplies; the reason being that if they did not supply gas for power at low rates they could not induce people to take it for such purposes. Some of the petitioners asserted that the Corporation were going to give Glasgow a preference over (say) Govan and Partick; but this was not the case. They in Glasgow were enormous consumers of gas for public purposes. In Govan and Partick they had built electric lighting works, and were lighting their public lamps to a large extent by means of electricity; using only a very small quantity of gas for outlying lamps. Yet these places held that they were entitled to be charged at the same rate as Glasgow. The Corporation argued that this was not fair, and said that anybody taking the same amount of gas as Glasgow would be treated in exactly the same way as Glasgow. To say that the small consumer was to be treated in the same way as the large one was contrary to the practice of most of the great gas-supplying corporations and companies in this country. Glasgow proposed an arrangement of this kind: For gas for lighting supplied in quantities of less than 500,000 cubic feet, 2s.; 1s. 11d. per 1000 cubic feet to be charged above this quantity and up to 6 millions; 1s. 10d. between 6 and 20 millions; and 1s. 9d. for quantities above the latter figure. This scale was something like what they thought fair. A large number of local authorities and companies had similar scales. Clause 49 raised some very important matters, and was the centre of a good deal of opposition. It provided that the Council should apply money received by them under the Bill to the payment of expenses and annuities, and in carrying into execution the powers and provisions of the Bill, and that they might carry any balance to the credit of the Corporation for their general purposes. The petitioners desired that instead of the surplus (if any) being carried to the credit of the Corporation, it should be applied in reduction of the price of gas. The provision did not alter the law; but made it perfectly clear. The petitioners really had no ground of complaint. The Corporation had possessed the power in the past; but they had only transferred £21,335 since 1869. Of this sum, £6000 was carried, in 1883, towards the recoupment of the Common Good fund of the Corporation, for advances made from time to time to meet the expenses of administering the Sales of Gas Act since 1863—expenditure which was really connected with gas. He maintained, as the Salford Corporation maintained last year when promoting a Bill, that the position of inside to outside was never intended by Parliament to be that of a bare trustee. For the ratepayers in a town a corporation was, of course, in the position of a trustee; but with regard to people outside its rating area, it was in the position not of a trustee, but of a company. The latter point had been decided in the case of the Wolverhampton Corporation against the Bilston Commissioners. The outside districts should, he claimed, be treated no worse by the Corporation of Glasgow than if they were supplied by a company, as, in law, the Corporation were, as regarded these districts. If the outside districts had been supplied by the two Companies whom the Corporation expropriated in 1869, the Companies would have had a large profit—10 per cent. on the original capital, and 7 or 5 per cent. on subsequent capital. Why were the districts to be treated better by the Corporation now? The ratepayers of the districts were not Glasgow ratepayers. Glasgow had borne the heat and burden of the day, and had taken all the risk, and Glasgow said: "I will treat you a great deal better than you would be treated by a company; but you shall not have any share of reasonable profits which we in the past have been justified in appropriating, and which in future we may feel justified in appropriating to similar public purposes." Partick and Govan, although they were supplying electricity, did not use their surplus profits from electric lighting to reduce the price. The surplus of these places was carried to the relief of rates. In a number of the petitions, it was suggested that the time had come when the gas undertaking should be

taken away from the Corporation of Glasgow and placed in the hands of a Joint Board. If a Joint Board was to be formed, it was a matter for a Bill; but there was no such Bill before the Committee. If the necessity arose, the Corporation would have a great deal to say against the formation of a Board. Such a Board would be improper in several ways. The Glasgow Corporation were, as had been decided in the Wolverhampton case, virtually a company in an outside area. If the Committee declared in favour of a Gas Board, the declaration would, in effect, oust the Corporation from their position of a company, and hand over their property in the outside districts to another authority—a Joint Board; it would be a compulsory transfer of their undertaking into the hands of the Joint Board, although, of course, they would be constituents of the Board. This, however, was not the custom when a company had been doing its duty; and there was no allegation here that the Corporation had not been doing their duty. It was ridiculous for these people to propose a Joint Board. Glasgow had 72 per cent. of the whole population supplied with gas. The valuation of the city was 76·64 per cent. of the total valuation of the gas area; and of the consumers, 73·9 per cent. were in Glasgow. It was the small minority which asked the Committee to force upon the Corporation the Joint Board. If these outer areas became part of the city, the question of limiting the amount of profit would go, because the outer areas would share the profit; and the question of a Gas Board would also go, because they would then be all one body. The Committee could not, however, inquire into the extension of the district; and he would suggest that they could not inquire into the question of a Gas Board. In conclusion, he referred briefly to the petitions, the main points of which he had already dealt with. Three other matters to which the evidence would be directed were the limits of supply, the differential rates, and the application of the revenue. He should have to take the guidance of the Committee as to whether they were to go into the question of the formation of a Gas Board. If the Committee said they would go into the matter, he would call evidence on it.

The CHAIRMAN: I do not suppose we shall reach the question to-day. My opinion at the moment would be that if this were purely a Consolidation Bill, it would be outside our province to hear anything of the kind; but as you are getting larger powers under the Bill, I am inclined to think (I am not giving the decision of the Committee) that it is germane to the subject before the Committee—the subject whether or not you ought to get any extension of your powers. I shall be in a position to-morrow to give a definite ruling on the point.

Mr. FITZGERALD: We are not asking you to form a Joint Board now. We are simply on the question of principle, to decide the principle whether you should insert a clause which has been put into other Bills.

Mr. BALFOUR BROWNE: It never has been put into other Bills.

The CHAIRMAN: I understand that Mr. Fitzgerald's position is that the Committee should not give any further powers to the Corporation, as circumstances have so changed that the proper method of dealing with this matter would be to create a new Board for the purpose?

Mr. FITZGERALD: That is so.

Mr. BALFOUR BROWNE: That I can clearly understand; but in order to do this, my learned friend must call evidence to show that a Joint Board is expedient. You said, Sir, that if this had been simply a Consolidation Bill, you would not have listened to any further proposal, but that we are asking for additional powers. But the further powers that we are seeking are not the things that are objected to. The thing the petitioners are most objecting to is the carrying of our surplus to the relief of our rates. There is not a word about a Joint Board in the Bill. With regard to the delimitation of districts, there is nothing new in that; and as regards the differential rate, we say the meaning of the clause is what we have been acting on—that we have differentiated in the power of rating, and that we are charging 2s. to-day to the ordinary consumers and 1s. 8d. to another person, and we have not been set right by the Courts. Nobody has said that it is illegal; and all we want to do is to continue it. All the other powers in the Bill that are new are not objected to at all.

Mr. *M. W. Montgomery*, the Convener of the Gas Committee of the Glasgow Corporation, examined by Mr. HONORATUS LLOYD, stated that the capital expended on the gas undertaking was fully £4,000,000, and that the revenue last year was about £864,000. They had over 1000 miles of mains, nearly 260,000 consumers, and supplied annually 6000 million cubic feet of gas. The works were capable of supplying 46 million cubic feet daily; and the largest day's supply was nearly 39 millions. The price now charged was 2s. per 1000 cubic feet for lighting and domestic purposes, and 1s. 8d. for motive power. Consolidation of the Corporation's various Gas Acts, nineteen or twenty in number, would provide, in one volume, an easy reference and a much better understanding of their powers. The provisions of the Bill were almost entirely a repetition of the provisions of existing Acts. Power was, however, sought to apply some additional modern provisions. The limits of supply in clause 6 of the Bill included the names of one or two places not mentioned in existing Acts, but in which the Corporation were at present giving a supply. Some towns and villages—Bowling, in the parish of Old Kilpatrick, Clarkston, Giffnock, Thornliebank, and Pollokshaws—the names of which had been inserted in clause 6, were included in one or more of the parishes named in the existing Acts, although the actual names did not appear. There were other places, the names of which were now inserted in the description of the limits of supply which, though not specifically named in existing Acts, the Corporation considered came under the words "other places intermediate and adjacent," in one of the Acts, and in which they were supplying. These places were Hawkhead, the parish of Carmunnock, Mearns, Renfrew, Cadder, and Paisley. Hitherto there had never been a definite boundary line showing the limits of supply; but the Corporation had endeavoured to arrange mutual boundary lines with the local authorities and companies who were supplying round about Glasgow. The Bill proposed to divide the area of supply into the City Supply District and the Supplementary Supply District. The City Supply District would embrace Glasgow and a number of populous burghs round the city, such as Govan and Partick. The Corporation had agreed provisionally to acquire the undertaking of the Baillieston Gaslight Company for £10,000. By clause 26, power was sought to give the consumer of a large quantity of gas an advantage—whether the gas was consumed in Glasgow or in a surrounding burgh. Glasgow as a large consumer would, of course, get the benefit which would accrue to a large consumer. This was a fair and legitimate advantage. Ultimately he believed the effect would be to cheapen gas all round, because it would develop the general consumption and prevent other means of power and lighting being substituted for gas. There was no idea of altering the policy of the Corporation in the future in order to keep up the price of gas, and thus to relieve the City rates. Cheap gas was essential to the policy that Glasgow had hitherto been pursuing.

Cross-examined by Mr. FITZGERALD: At present, the Glasgow Corporation were bound to supply gas to private consumers in Govan at the same rate as they supplied private consumers in Glasgow; and they were also bound to supply the Govan Corporation at the same rate as they (the Glasgow Corporation) supplied themselves. Glasgow did not want to get out of this obligation. The clause relating to this point did not re-enact the provisions in the earlier Act. It altered them by giving an advantage to large consumers.

Mr. FITZGERALD: Under your existing legislation, there is a specific enactment that when a consumer is supplied by meter, the charge is to be the same in the whole of the district whether inside or outside Glasgow?

Witness: Yes.

You are repealing that provision and not re-enacting it anywhere; and under clause 26, as it stands, you may charge one price in Glasgow and a different price in Govan or Partick, or any other place?—That is not the intention.

The CHAIRMAN: The Committee are of opinion that the clause in the Bill, as proposed, would undoubtedly make an alteration in the existing gas supply. This may be a matter for argument afterwards; but I do not think there is any necessity to put it to the witness.

In further cross-examination, witness said he objected to coming under the general Scotch law, under which gas profits went to reduce the price to the consumer. They had had the power contained in the Bill in this respect for forty years, they had not abused it, and they saw no reason for departing from the terms they had already obtained. Glasgow enjoyed similar power with regard to the water undertaking, and were charging 4d. inside and 10d. outside the City. The Lord Provost in several speeches had mentioned a proposition to supply free water within the City of Glasgow; but the proposal had not come before the Corporation. Counsel put to witness the following alleged statement of the Lord Provost: "A free water supply to Glasgow would probably cause jealousy in the adjoining burghs who received their supply from the City; but if they wished to share in the benefit, they would amalgamate with Glasgow." Witness, however, did not see what that had to do with the gas undertaking.

Mr. FITZGERALD: If you are going to have free water in Glasgow, why not free gas? What is to prevent you?

Witness: Free gas has never been mentioned.

But it is coming you know?—Of course, under our clauses we should require to give free gas to everyone. Continuing, witness declined to suppose, unless a rise in the price of coal or other consideration justified them, that the Corporation would increase the price of gas to (say) 3s., and make a large profit and apply it entirely in relief of the rates of Glasgow. In the 41 years the Corporation had had the gas-works, not a penny had come from the ratepayers of Glasgow to support them.

Cross-examined by Mr. FREEMAN: When, in 1874, the Rutherglen Gas Company was transferred to the Glasgow Corporation, a distinct parliamentary bargain was made between Rutherglen and Glasgow to preserve equality of price. He thought the Bill re-enacted this bargain.

Wednesday, April 6.

On the resumption of the proceedings this morning,

Mr. BEVERIDGE asked whether the Chairman intended to go into the Gas Board question. If so, he should have to examine Mr. Montgomery upon the point.

The CHAIRMAN: No; I think our decision will obviate the need for any further examination on this question. The decision we have come to, after consultation, is that it is very unusual to hear an alternative scheme; but we may call on Counsel to speak on the point at the end, and, if necessary, we might ask for evidence. But we will not take evidence-in-chief now on the desirability of a Joint Board.

Mr. *Montgomery*, in cross-examination by Mr. TALBOT, said he did not think it would be possible for the Corporation of Glasgow, in virtue of their statutory monopoly of supply, to maintain the price of gas at a higher rate than was absolutely necessary in order to earn surplus profits which might be applied to reduce the rates within the area of the City of Glasgow.

Cross-examined by Lord R. CECIL: The maximum price chargeable was 4s. 7d. In Glasgow, the charge was actually 2s. They could therefore charge 2s. 7d. more in the supplementary area. They had, however, only charged 1s. more. The charges in different parts of the supplementary district might vary under the Bill. He did not say there was no intention of levying a higher charge than 1s. extra. Baillieston had been in the city supply district; but it was proposed to place it in the supplementary district; the reason for this being that the Corporation were paying £10,000 for the Company's works, and that unless Baillieston was placed in the supplementary district, with the consequent increase of price, it would not pay the Corporation to acquire the undertaking on the terms stated.

Lord R. CECIL: If it is the policy of the future to use the differential rates in order to drive outside districts into the city of Glasgow, it is not much satisfaction to us to know that they have hitherto only charged 1s. extra?

Witness: I cannot consent to the statement that that is the policy of the Corporation so far as the Gas Department is concerned.

Is there not a motion before the Corporation that the Common Good fund should be devoted to the reduction of rates?—No. There may be a motion to consider it; but I do not think there is a direct proposal to that effect.

If the policy is carried out, there will be nothing to prevent an increased rate up to 4s. 7d. on the whole of the supplementary area, in order to pay for the gas of the citizens of Glasgow, and so compel the outside areas to come into the City of Glasgow?—The supplementary

area is so small that the contribution would have no effect whatever in helping the rates. I do not recognize the possibility that such a thing could ever take place.

Mr. BLENNERHASSETT: I appear for the Baillieston Gaslight Company. Since we presented a petition against the Bill, terms of purchase have been arranged between the Glasgow Corporation and the Company; and these terms are embodied in additional clauses. It would not be possible for me to cross-examine on this matter at present; but in case the purchase should not be sanctioned by the Committee, I would ask leave to be heard in support of the petition, and to call evidence.

Mr. *Montgomery*, in further cross-examination by Mr. WILSON, said the Busby and District Gas Company, or their predecessors, had had power for seventy years to supply gas in the parishes of Mearns, Cathcart, and East Kilbride, and for twenty years in the parishes of Eastwood and Carmannock. Following on the withdrawal of a large annexation scheme, Glasgow, in response to requisitions, laid pipes, side by side with the gas-mains and pipes of the Company in the parish of Eastwood, and about Giffnock. The Company (a small concern, with £10,000 capital) charged 4s. there; but the Glasgow Corporation had to charge the city price of 2s., because the district was within the city boundary. Subsequently an agreement was entered into with the Company. Glasgow bought the pipes in the parishes of Eastwood and Cathcart, and left the works to the Company. They also left to the Company the mains supplying Mearns, Carmannock, and East Kilbride. There was an understanding also that the Corporation were to supply the parish of White Craigs; and boundaries were arranged accordingly. This arrangement had not been departed from by Glasgow. Asked whether it was fair that Glasgow should compete with the Company in Mearns and Carmannock, witness said there was an agreement with the Company; and he had understood that their opposition was entirely withdrawn.

In cross-examination by Mr. FORBES LANKESTER, witness said that hitherto the Corporation had had no power to charge differential rates to private consumers. As a fact, however, where gas had been used in large quantities for power for manufacturing purposes, rebates had been allowed. They thought they had a clause with reference to the supply of non-illuminating gas; and this gas was used for non-illuminating purposes. There might be a doubt as to whether they were acting *ultra vires*. While Messrs. Brown's works in Clydebank had been paying 2s. per 1000 cubic feet for gas for illuminating purposes, and 1s. 8d. or 1s. 9d. for manufacturing purposes, the Burgh of Clydebank itself, although taking more gas than Messrs. Brown, had had to pay 2s. or 2s. 2d.

Cross-examined by Mr. KING: The Caledonian Railway Company were almost, if not actually, the largest consumers of gas, except the Corporation itself, in Glasgow; their gas account in 1908 having been £5930. The Bill discriminated between private lighting and lighting for any other purpose. Whatever advantage would result under the Bill to gas consumed in large quantities for private lighting would benefit the Company. They would not get any of the advantage which would result under the Bill to large consumers of gas for public lighting. At present, whatever was charged the Railway Company for their public lamps, and for the stations, railway roads, and approaches, was also charged the Corporation. Under the Bill, this would be altered. Yet the Act was intended to benefit the largest consumer.

Mr. HONORATUS LLOYD read correspondence which indicated that negotiations between the Corporation and the Busby Gas Company for the withdrawal of the Company's petition broke off on the Corporation refusing to pay the Company's expenses.

In re-examination by Mr. HONORATUS LLOYD, witness said that in 1901, when the Glasgow Corporation purchased the Company supplying in Milngavie, there was a distinct understanding that a differential rate would be charged.

By the COMMITTEE: It would be a very difficult thing to embody a scale of charges in the Bill, because the price of gas rose and fell according to the price of coal and other articles. A limit of some kind, with regard to the amount of differentiation between one district and another, might be embodied. The Corporation were supplying 18-candle power gas, although they were obliged to supply only 16-candle power. He could not say what profit would result from the proposed reduction in the candle power. Asked whether he knew of any case in which a reduction of candle power, without some corresponding reduction in maximum price, had been allowed, he said he believed it was usual to have a corresponding reduction in the maximum price. He could not name any authority which in recent years had obtained power to apply profit to the Common Good.

Mr. *Alex. Wilson*, Engineer and General Manager of the Glasgow Corporation Gas Department, examined by Mr. BEVERIDGE, said that since 1902 the additional cost of supplying Milngavie amounted to £7320, while the total extra revenue obtained from the place during the same period was £6289; so that there was a loss of over £1000. He knew of no arrangement under which, after the Corporation had recouped themselves the cost of purchasing the Company which supplied Milngavie, that place should be put in the same position as Glasgow. The price charged by the old Company in Milngavie was 4s. 7d.; now the charge there was 3s. The County Council objected to the proposed limits of supply, on the ground that they were vague and inadvisable. But the limits of supply had never been defined by any hard-and-fast boundary. The Corporation had no intention of competing with any gas authority or company around their city supply district; but they were of opinion that in any particular part where gas was not now supplied, and which was quite close to their district, it would be very hard on the inhabitants to draw a hard-and-fast line. With regard to the price of gas, witness explained that, when the competition of electricity sprang up, he prepared a scale showing reduced prices to meet the case of large consumers. He felt at the time that the Gas Department was being fettered. The competition was affecting the Corporation's best customers; and the Corporation were unable to give a better rate to them, as they would have been entitled to do had they had the usual clauses. The Corporation, however, shortly afterwards gave a reduced rate for gas supplied for power and manufacturing purposes. There might be some dubiety about the charge. The clause now in the Bill would free the matter from all ambiguity. Such a scale as had been suggested here had been adopted by many undertakings. Some large consumers in Glasgow had actually introduced their own plant to provide themselves with gas power. Several others had said that, unless the Corporation reduced the price, they would put in plant for the production of gas of one kind or another. Unless there was some concession, the number of consumers who took gas from the Corporation for power purposes would in a year or two be very much reduced. If the suggested scale were adopted, it would mean a saving to the local authorities outside as public lighting authorities. The competition of the electric light, especially with regard to street lighting, was very severe. Of the gas used for public lighting purposes, 81 per cent. was consumed in Glasgow.

Mr. BLENNERHASSETT, at this point, informed the Committee that an arrangement had been come to between the Burgh of Dumbarton and the promoters.

In cross-examination by Mr. FREEMAN, in regard to the charges to be made for gas for public lamps inside and outside Glasgow, witness said he thought they should have the power to make an extra charge for the sake of competition by electric light.

Mr. FREEMAN: The Glasgow Corporation are the electric lighting authority in Pollokshaws. Why do they want a weapon of defence against themselves? It looks rather like a suicidal policy?

Witness: But the two departments are run quite separately; the competition as regarded electricity is as keen in Glasgow as anywhere else.

Further cross-examined: On the differential rate suggested, Glasgow would save £5478, Rutherglen £58, and Pollokshaws £21.

Cross-examined by Mr. WILSON: They were not going to hurt or affect the Busby Company. That Company were asked to supply in a particular area, but would not do so. Thereupon the Corporation gave a supply there.

Thursday, April 7.

When the hearing was resumed this morning,

Mr. *Wilson* was cross-examined by Mr. BLENNERHASSETT. He said there was no desire to make any distinction between the inside and the outside areas excepting under special circumstances. Therefore, if it could be shown that the special cost of supplying Milngavie had been repaid, there was no objection to reducing the rates. With regard to the £4000 paid for the Milngavie gas undertaking, £1335 had been struck off for depreciation. He did not agree that the gas consumers in Milngavie had to pay more now than under the old system because the illuminating power was inferior.

Replying to Counsel for the promoters, witness said the £1335 referred to was an allocation from all sources on the Milngavie undertaking. Although the population of the outside areas had increased rapidly, the consumption of gas in the last five years had not increased. It would be advantageous to have a reduction in the charge for taking a quantity of gas for public and private lighting. Of the total revenue, the public lighting amounted to 10 per cent. By increasing the consumption they hoped to reduce the price. It was also the intention of the Corporation that the original price of gas for public and private lighting was to be the same to every body in similar circumstances. Cadder was the only district in which there was not a gas supply. The Glasgow gas undertaking was for the benefit of all the consumers; and their chief object was to cheapen the price of gas so as to increase the consumption.

Replying to questions by the CHAIRMAN, witness said that if there was a benefit in the cost of production it went to the consumer; and if it was found that, by reducing the quality of the gas there was a surplus, it was carried forward. They had used their profits to keep down the price and to depreciate what they knew was an excessive price for an undertaking. In the districts supplied, the increase had not been great; and in one year there was a heavy deficit. In Glasgow, the increase in the gas supply was not what it ought to have been in a city of its size.

Mr. *Robert Macfarlan*, Auditor to the Corporation, gave evidence. He said the liabilities of the shareholders of the old Companies were regulated by the gas guarantee rate; and in the event of the undertaking becoming a total failure, the working debts would be covered by the Common Good of the City. His opinion was that the Glasgow gas undertaking had been efficiently carried on. He agreed that a sum of £21,000 had been taken from gas profits and applied to municipal purposes, and on one occasion £13,000 was applied to electric lighting.

Mr. *Walter Nelson*, a Chartered Accountant and a member of the Corporation, said that for many years the volume of business in the gas undertaking had been steadily increasing. The consumption of gas in twenty-four hours in the year 1873-4 was 9,162,080 cubic feet; in 1883-4, 13,700,000 feet; in 1893-4, 22,853,000 feet; in 1897-8, 31,354,000 feet; and in 1908-9, 34,830,000 feet. After providing for the maintenance of the gas undertaking, any surplus, whether within or outside the borough, should be applied for the benefit of the borough.

Replying to Mr. FREEMAN, witness said he did not agree that they might keep the price of gas for all time at its present figure, or even increase it and carry every farthing of profit to the benefit of the citizens of the borough. The works they now possessed were capable, when fully completed, of manufacturing about twice the quantity of gas per day which could be produced by the works prior to 1899.

In answer to the CHAIRMAN, who asked whether there was any fixed limit for writing off depreciation, because it seemed that the smaller the gross profits the more was written off for depreciation, witness said that since the year 1906 there had been a fixed rate of depreciation of 2 per cent.

Replying to Lord R. CECIL, witness said the percentage of depreciation varied according to the profits.

Mr. *Corbet Woodall* said that for many years the Glasgow Corporation had carried on the gas undertaking to the great advantage of the consumers both inside and outside the city. Unlike most municipal gas undertakings in Scotland, Glasgow was not restricted from charging a higher price for gas than was requisite to meet the expenses of the undertaking. With regard to the appropriation of surplus profits in the past, the Corporation, he thought, had done well in only carrying

a small amount of the credit to the rates. They had splendidly resisted the temptation. The sum did not, in fact, equal 1d. per 1000 cubic feet of gas sold in one year. If an extravagant amount were written off for depreciation, it would tend, no doubt, to increase the value of property in the hands of the Corporation. The sooner items which were not really represented by real assets were written off from the accounts the better. The powers that were being sought for in the Bill had been granted without question to a large number of corporations. He did not know of any cases where the maximum price had been affected where an alteration in the illuminating power of gas had been allowed. He was in favour of a differential rate for gas governed by the distance from (say) the generating station on the gas-works. Without it, there could be no doubt that consumers in the district where the gas-works were placed were damnified, because the cost of distributing to the outside was very much greater than to the inside. Where there was no differential rate, he thought there was a clear case for appropriating a certain amount, or something like a clear case, to the special benefit of the gas supplying authority. If there was no differential rate, there ought to be an allocation of surplus profits. There were many cases in which the illuminating power had been reduced without any corresponding reduction in the price of gas; Coatbridge being one. There the illuminating power was brought down from 20 candles to 14 candles without any modification whatever of the standard price.

Replying to Mr. FITZGERALD, witness agreed that where a discount was given to a consumer for prompt payment there did not, on the face of it, seem to be any reason why a man with a large account should have more for prompt payment than one with a small account. The proposal in the Bill was to allow a discount or rebate to consumers "in consideration of prompt payment of the gas charges, not exceeding in any case 5 per cent., provided that all discounts or rebates shall be of equal amount under like circumstances to all consumers." It was the same in the Model Bill, with the exception that the discount was 10 per cent. He could not recall any case where an outside district had obtained from Parliament a flat-rate where Parliament had allowed a differential rate to be put upon the district against its will. Asked with regard to the differential rate whether he was applying that rate according to the quantity taken being more or less, witness said the differential rate would apply rather to the question of distance from the point of generation than to the sparsity or otherwise of the population. He admitted the extreme awkwardness of modifying arrangements made by agreement before Parliament. The whole point in regard to supplying the big consumer and the small one was that there was less trouble to deliver at one large place which took 10,000 cubic feet as compared with ten small places which each took 1000 feet.

Friday, April 8.

When the proceedings were resumed this morning, the first witness called was

Mr. *Charles Hunt*. He dealt with the question of the proposed reduction of price to large consumers of gas. He saw no reason why such power should not be conferred. Corporations put their surplus profit to the benefit of the rates of the town. In many cases they had parliamentary power so to do. He considered this was a fair provision in view of the risks of gas being superseded by electricity. Replying to a question as to whether it was quite fair that the benefit should be entirely given to the large consumer, witness said that the idea was to encourage consumption on a large scale. They would not encourage consumption to a proportionate extent by reducing the price all round, because the large consumer was a more variable customer. He was not aware that when the Glasgow Corporation previously purchased Companies in one case they put in a clause to charge everybody alike. Their gas undertaking at present was very successful.

Mr. WILSON: What is there to justify the tearing up of a parliamentary agreement which has lasted for twenty years?

Witness: Conditions have changed. We have now to face the competition of electricity.

Do not the Corporation own the electricity undertaking?—Yes.

Then if the right hand makes more than the left hand, is it a very great hardship?—It is hard on the gas undertaking.

I suggest that there is no reason why a parliamentary bargain should be torn up at the expense of the small consumer?—We are asking to be put on the same basis as other corporations.

It is the general law of Scotland that corporations carrying on gas-works cannot allocate profits to their general benefits. Why should not this apply to Glasgow?—One or two districts outside Glasgow are supplied at the same rate as Glasgow.

What do you mean by the word "risk"?—For example, Partick has taken the whole of its lighting away.

The Corporation have never yet been called upon to find a halfpenny of guarantee fund, and they have substantial margins to carry forward, while they have from time to time tried to raise the price of gas. So that if the price of coal went up, or anything like that, they could increase their charges?—Yes; but that would mean a reduction of the consumption.

Witness went on to say that during the time he was at Birmingham, there was a differential rate of 50 per cent. Immediately after its adoption, a Bill was promoted; and they were completely successful.

Mr. ELVERSTON: The loss in Partick you spoke of as being a risk to Glasgow, yet while the decrease has taken place in public lighting, there has been an increase of 41·69 per cent. in private lighting in the same period. That does not show much loss to Partick on the face of it. It is a gain of 41 per cent. in the ten years.

In further cross-examination by Mr. WILSON, witness said the consumption of gas in Birmingham was a little more than in Glasgow. The price, as shown by the last returns, was from 1s. 9d. to 2s. 4d. per 1000 cubic feet, according to the amount consumed. In 1875, there was a differential rate as regarded districts. He had previously stated it at 1s. This had been abolished on the application of the outside districts. He believed Perth had a differential rate.

Counsel having pointed out that in one case, in the parish of Old Monklands, 2s. and 3s. were the respective prices for gas on the two sides of an imaginary line, witness said that they must draw the line somewhere.

Replying to Mr. CRAIG HENDERSON, witness said they supplied railway companies at Birmingham. They gave discounts, according to the quantity used, to all large consumers there, under authority of the Gas-Works Clauses Act.

Mr. *W. R. Herring*, the Chief Engineer and General Manager of the Edinburgh and Leith Corporations' Gas Commissioners, was next called. He held that it was a fair bargain for the Glasgow Corporation to charge a higher rate to the outlying districts. The practice was a common one. There were many instances in Scotland since the Act of 1886. In Edinburgh, they had power to charge not more than 6d. per 1000 cubic feet above the inside rate. In Perth, they were entitled to charge 4d. per 1000 feet extra for every mile beyond the boundary. These powers had been granted since 1886—some of them in 1900 and 1907. The main object of the Corporation was to supply gas for industrial purposes at a lower rate than for lighting, because it was consumed for a greater number of hours. There were other charges which arose in the case of the small consumer, but which did not affect the large consumer, such as the supply, inspection, and repair of meters. He cited Edinburgh as an instance where a territorial differential rate was enforced. In that case, there was a provision in the Statute that they must fix the price so that the revenue would meet the expenditure, and they could not make a penny of profit. Asked if he saw any objection to Glasgow putting in a similar clause, witness said the Scottish Office opposed it, in so far as they had to give a very full explanation. There was no popular opposition. In Partick, the price was fixed so that the revenue must meet the expenditure. Replying to further questions, witness said that in Edinburgh the differential rate was 6d. The figure which ought to be put upon a loss by transmission per mile varied from 5 per cent. or 6 per cent. up to 10 per cent. It was true that Edinburgh and Leith had removed their gas-works miles from the centre of the town.

Mr. FRASER, for the Milngavie township, pointed out the hard case of his clients, whose boundary ran up to the line over which it was proposed to charge a higher rate; but it was on the wrong side of the line. They were to be mulcted just as if they were miles away.

Witness: The line must be drawn somewhere. It was largely a question of the distance workmen had to go to attend to the works, and of the sparsity of population.

The distance is exactly the same as from your own works to the centre of Edinburgh?—But that is the smallest part of the work. I am speaking of the administration of the outdoor department, which is from the centre of the town, not from the works. Milngavie was very unfortunately situated.

If we can show that Glasgow has been recouped for the cost of the works and has made a profit out of Milngavie, should not the extra rate cease?—Yes; but you cannot show that.

Mr. CRAIG HENDERSON: You are the first witness to say it is just to charge more for private than for public lighting. Is the upkeep of the meters the sole justification?

Witness: That is my opinion. The labour involved in lighting gas is not included in the gas-rate.

If every consumer pays for his own fitting, how does that apply to the Forth and Clyde Canal, which belongs to my clients? We are charged not by meter, but at the same rate as the public lamps. But now there is a proposal to discriminate?—I should think it might be taken the same as street lighting.

Does it matter whether you are lighting a street lamp or a railway station?—Yes. We must draw a distinction between public and private lighting. Public lighting is a necessity required by public convenience or by Statute. If an accident happens on their private road, the Railway Company are responsible. They are responsible for lighting their own premises.

Replying to further questions, witness said they supplied Railway Companies in Edinburgh. Their practice in regard to discounts was to make it subject to the particular premises concerned. What would the Railway Companies say if their stations and roads were to be treated as public property in other respects? In Edinburgh, they had one district within half-a-mile of the gas-works which was charged 1s. per 1000 cubic feet above the City rate. It was a matter of uniformity to treat all the outside districts alike.

Mr. *John Cowan*, an engineer in practice in Glasgow but residing in Giffnock, was the next witness. He viewed with the utmost alarm any proposal for the Corporation withdrawing from that area. He had approached the Busby Gas Company with a view to supply; but their terms were too onerous. Taking all the circumstances into account, he thought the area allotted to the Company in the Bill was fair. It would not be an advantage to have all under one authority. He would like to see some competition. At present, the Corporation had authority to supply two parishes (Eastwood and Cathcart) formerly served by the Busby Company, and they sought powers to extend into two areas in the parishes of Carmunnock and Mearns. Counsel suggested that what Busby asked for was a guarantee for the return on the capital expended over the half-mile for bringing a pipe from Giffnock; and witness replied that he thought the price was high.

Replying to Mr. BEVERIDGE, witness said the Busby Company was not a statutory concern, and had no limit to its price whatever.

Mr. *William Gibb*, a Director of the Baillieston Gas Company, said their district was over three miles from the nearest municipal boundary of Glasgow. Their capital had risen from £1500 in 1866 to £4573, and they had spent considerable money on extending and improving their works. They could not manufacture gas as cheaply as the Glasgow Corporation.

Mr. *T. Eaton Robinson*, City Accountant and Registrar under the Glasgow Corporation, in reply to Mr. BALFOUR BROWNE, gave evidence as to the borrowing powers from the report of the Secretary for Scotland on the Bill. The aggregate borrowing powers of the Gas Department at May 31 last were £3,072,268, as set forth in the statement of borrowing powers printed for the Committee. Of this sum, there had been borrowed £2,142,268; leaving a balance of £930,000 borrowing powers unexhausted. A special item of £15,000 was referred to in the Scottish Office report as having been over-borrowed by the Gas Department during a short period when the then authorized borrowing powers were exhausted. The sum was temporarily taken from

the borrowing powers for electricity, and refunded within a very few months. The Corporation, being of the opinion that the Scottish Office would prefer an equated sinking fund to a continuation of the varying sinking funds under the present Acts, instructed the drafting of the clauses. The new proposals were arrived at by estimating a rate which would produce an amount somewhat in excess of the total which must be set aside annually under the present Acts. The balance unapplied, but invested in statutory securities, is, as stated by the Scottish Office, £84,934, of which £43,663 was applicable to annuities. In regard to the suggestion that the annuity sinking fund should be accumulated, this was exhaustively considered by the Scottish Office and the Committee, when the sinking fund was fixed at 1½ per cent. on the then estimated market value of the outstanding annuities; and it was not provided that this sinking fund should be accumulated. The annuity stock was irredeemable; and the greater part of the balance was now held by permanent trusts, and would not come into the market. The sinking fund now proposed would probably have to be paid for many years to come, and would, it was believed, be most simple. The Bill provided for a sinking fund of 2 per cent. on the present market value of the annuities. This represented £11,791, to which there fell to be added £6126—being 2¼ per cent. on £272,268, the amount of Corporation stock issued in lieu of converted annuities. These sums together amount to £17,917, as compared with the minimum of £15,000 suggested by the Scottish Office, which, he thought, was an unnecessary provision.

Mr. CLODE, in the course of a speech, said it was perfectly obvious that the Corporation were seeking powers to differentiate between private gas lighting and gas used for other purposes. A lower rate for the streets of Glasgow than for their stations and footpaths was aimed at. At present, they were not entitled to do this; and his clients objected to the amendment. It was true that they professed to make the amount of gas consumed the test as to whether the reduced rate was charged; but the Corporation counted as one consumer, and the Railway Company did not.

Mr. *W. S. Brown*, the principal shareholder of the Busby Gas Company, gave evidence. The Company had a capital of £10,000, of which he owned about half. It was a pioneer Company in those parts. In 1888, Clarkston and Busby applied to Glasgow to extend their pipes so as to compete with the new Company, and they refused; so they were left to develop the district. They had been supplying Giffnock for some years before Glasgow took over the pipes from them. When they resolved to extend their mains to Giffnock, they laid them beside the Company's pipes. The Company reduced their price; and the people, with few exceptions, refused to have anything to do with the Glasgow supply. They had no enthusiastic representatives there; but they bought the Company out for £9000.

Mr. WILSON: Was it not a staggering blow when you saw it in the Bill that the Corporation were asking for powers to include the whole parishes of Mearns and Carmannock?

Witness: Yes. They should either leave the district to us, or buy us out.

Mr. *William J. G. Shaw* and Mr. *David Arthur Keay*, giving evidence on behalf of the local ratepayers, supported the previous witness.

Mr. WILSON, summing up on behalf of the Busby Company, said it was a parliamentary practice that a non-statutory Company who had been supplying the district for so long should not be disturbed by any outside authority or company with statutory powers. They made the same fight with regard to the Busby Water-Works in 1857; and they were beaten. They should take the common-sense view of Mr. Brown, and either buy up the Company or keep out of the business altogether.

The Committee adjourned until yesterday (Monday).

LITTLE HULTON URBAN DISTRICT COUNCIL BILL.

The Committee of the House of Commons presided over by Sir FRANCIS LEYLAND-BARRATT had before them on Wednesday last the clause dealing with gas matters in the Little Hulton Urban District Council Bill (*ante*, p. 53).

Mr. LEES, the Agent for the Bill, read the clause, as follows:

(1) The agreement made the 14th day of March, 1910, between the Corporation of the one part and the Council of the other part, set forth in the first schedule to this Act, is hereby confirmed and made binding on the parties thereto.

(2) The sale of the undertaking shall be carried into effect and evidenced by deed in accordance with the provisions of the said agreement; and on the execution of the deed by the Corporation, the gas undertaking of the Corporation, with its rights, powers, and privileges, shall, by virtue of the deed and of this Act, become, and shall thenceforth be transferred to, and vested in, the Council, and such transfer and vesting is in this Act referred to as "the transfer."

(3) The before-mentioned purchase money, when received by the Corporation, shall be applied by them to gas-works purposes to which capital is properly applicable, or in the repayment of any outstanding moneys borrowed by the Corporation for gas-works purposes, or in such other manner as may be approved by the Local Government Board.

Mr. CRIPPS, on behalf of the Salford Corporation, said the only point he wished to raise on the clause was that if there were any variation of the agreement between the Salford Corporation and the Little Hulton Urban District Council, another application to Parliament would be rendered necessary. He thought the Committee might assent to the insertion of a provision in the clause so that, if need be, the parties could agree to a variation.

The CHAIRMAN pointed out that the agreement was put in before the Committee; and it was on the agreement that the Committee had given their decision. He could not see what possible variation the parties could desire, because it was clearly the transfer of mains and goodwill for a definite sum of money.

The Committee decided against the application, and the clause was added to the Bill.

LEGAL INTELLIGENCE.

CLAIM UNDER THE WORKMEN'S COMPENSATION ACT.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, April 6.

(*Before Justices* DARLING *and* BUCKNILL.)

Flower v. Southampton Gas Company.

This was an appeal by the defendants from the decision of his Honour Judge Gye, ordering an agreement for compromise under the Workmen's Compensation Act to be registered. The claim arose under the Act of 1897, which provided that the accident must have happened "on, in, or about" the premises of the employer. As a matter of fact, it occurred in this case about a mile from the works; and when, after about twelve months, this came to the defendants' knowledge, they stopped further payments, and the plaintiff applied to the County Court Judge to file a memorandum of agreement. In spite of the defendants' opposition, this was done.

Mr. SIMON, K.C., and Mr. S. H. EMANUEL appeared for the appellants; Mr. BARRINGTON WARD and Mr. CLARKE HALL represented the respondent.

Justice DARLING, in giving judgment, said he had come to the conclusion that the appeal must be allowed. The facts were these: The plaintiff, while in the employment of the defendants, met with an accident at a distance from the works, which, as the law then stood, gave him no claim under the Workmen's Compensation Act, as the accident did not occur "in, on, or about" the premises. The claim made, so far as it conveyed any information, led the defendants to believe that the accident did occur upon their premises under circumstances which gave the plaintiff a legal claim under the Act; and they paid him 11s. per week. Afterwards, when there was some negotiation for a settlement of the claim in full, it came to their knowledge that they had been paying under a misapprehension; but because one of their clerks, twelve months after the accident happened, and six months before the defendants finally refused to pay, knew the place where it had occurred, the County Court Judge came to the conclusion that there was an agreement that the defendants should go on paying the plaintiff 11s. per week. He did not think there was any evidence that they agreed to do anything of the kind. There was no consideration for the agreement; and the plaintiff had admittedly no claim on the defendants, as it appeared that he knew perfectly well where the accident occurred and they did not. It must be assumed that the plaintiff knew the law, and that he had no claim on the defendants; and if they had known where the accident occurred, they also would have known that he had none. There was no evidence whatever upon which the County Court Judge could come to the conclusion that there was an agreement between the parties. It was said by Mr. Barrington Ward that the agreement must be registered, even though it might be a bad one; and in support of this statement he cited the Scotch case of *Macdonald v. Fairfield Company*. But there the agreement was a good one. The Scotch Court decided that, there being a real agreement, it must be registered, though it was possible some relief might be gained by one of the parties. In the present case there was no agreement; and, therefore, the memorandum ought not to have been registered.

Justice BUCKNILL concurred.

The appeal was accordingly allowed, with costs; but their Lordships gave leave to appeal.

Position of the Perfect Mantle Company, Limited.

In the Chancery Division of the High Court of Justice last Wednesday, Mr. Justice Swinfen Eady heard a petition by the Perfect Mantle Company, Limited, which Mr. Martin, for the petitioners, said was for the confirmation by the Court of a scheme of arrangement entered into between the Company and their creditors, providing for a composition. His Lordship sanctioned the scheme.

Receiver Appointed for the Cobham Gas Company.

In the Chancery Division of the High Court of Justice last Tuesday, before Mr. Justice Neville, Mr. H. E. Wright moved for the appointment of a Receiver for the Cobham Gas Company, at the instance of Mr. Fitter and two other debenture holders. He said the total amount of debentures issued was £5400; and the interest was two years in arrear. There was no appearance on behalf of the Company. His Lordship said the order would be in the regular form where a statutory company was concerned; and he appointed Mr. Augustus C. Palmer Receiver, on giving security.

Bens Gas Company to be Wound Up.

His Honour Judge Scully had before him at the Brighton County Court, a few days ago, an application on behalf of the Bens Gas Company, Limited, of Chichester, for the winding-up of the undertaking. Mr. H. Lemon, who represented the Company, said it was incorporated in August, 1908, for the purpose of carrying on the business of manufacturing plant for the production of petrol gas to be used for lighting and heating. His Honour pointed out that the balance-sheet down to Sept. 25 last showed a gross profit of £704; and he asked how it was that the Company had got into such low water. Mr. Lemon replied that in August last a claim was set up against the Company for damages for an alleged explosion; and a verdict was given against them for £151 damages and costs. The Company could not pay this amount or their debts, and desired to be wound up. Mr. Cannot, barrister, opposed the application on behalf of Mr. Pine, the creditor who had obtained the judgment against the Company. He urged that the real object of the petition was to defeat the judgment creditor,

though from the balance-sheet and statements made by defendants at the trial, the Company were doing an excellent business. In support of the petition, Mr. L. E. Currey, Secretary of the Company, gave figures which his Honour said showed that to meet liabilities of £2040 the Company had assets of £1615. Witness said the object of winding-up the Company was not to defeat the judgment creditor, but to secure the creditors, and provide for an equitable distribution of the assets among them. Last November the Company were experiencing financial strain; and the Directors were of opinion that they should wind up. Negotiations were going on; and it was hoped the concern would be sold. They therefore kept the Company going; but the negotiations fell through, and they were not able to get the additional capital anticipated. The result of the action on the goodwill was that it was really worth nothing; and witness did not think it was now possible for the Company to carry on business. After hearing Counsel on the legal points, his Honour said that, upon the evidence, it was clear the Company was insolvent, and he saw no reason why it should not be wound up. He therefore made an order accordingly. He added that the judgment creditor had no power to enforce his execution unless the Company waived their right to have notice. Mr. Lemon intimated that the Company would not do that. His Honour pointed out that application could be made at the next Court; and Mr. Cannot said this should be done.

Bampton and Aston District Water Company.

Last Friday, Mr. Rolt applied to Mr. Justice Swinfen Eady, on behalf of Messrs. Willey and Co., Limited, for the appointment of a receiver and manager of the above-named Company; plaintiffs being the holders of debentures for £600 out of an issue of £4000 which were secured on the undertaking and assets. Interest was a year-and-a-half in arrear; and though the Company had endeavoured to pay, they had not succeeded in doing so. They now asked applicants to agree to a renewal; but this was not assented to. His Lordship asked whether the Company were supplying water. Mr. Rolt replied that they were; but he said he gathered from the correspondence that they had not many customers. He understood that Mr. Luxmore, on behalf of the Company, was willing to consent to Mr. William Cash being appointed Receiver and Manager, and to the usual debenture holder's judgment. His Lordship made the order, and limited the appointment of Mr. Cash to three months; the time not to be extended without the sanction of the Court.

Facilities for Rifling Prepayment Meter Boxes.

When presiding a few days ago over the Children's Court for the north-eastern and eastern districts of London, at Old Street Police Court, Mr. Cluer, the Magistrate, offered some advice to gas companies who supply penny-in-the-slot meters. The remarks were made during the hearing of a charge against James Mudd, a boy of 12, for stealing 3s. 4d. from a gas-meter at the house of his father in Grove Road, Bow. The father, in giving evidence, said he had caught his boy rifling the money-box attached to the meter, having opened it by means of a small box-key. It was exhibited, and proved to be a very ordinary one, such as is used for cheap workboxes. Having examined it, Mr. Cluer said he would suggest that someone from the prosecuting Company (the Commercial) should visit some well-known lock maker, when he had no doubt they would be supplied with locks which no ordinary key would open. Mr. Frowde Phelps, solicitor, representing the Company, said his Worship's remarks should be conveyed to them. Continuing his evidence, the father said his boy admitted that he had on previous occasions taken small sums of money from the meter by means of the key. He added that the boy was more than he could manage, and he would like him to be sent away. Mr. Cluer refused to relieve the parent of his proper responsibility, and advised him to punish his boy for the offence. He bound the accused over for twelve months in the father's recognizance of £5; remarking that if the boy misbehaved the father would suffer.

Water-Gas Plant for Birkenhead.—At the meeting of the Birkenhead Town Council last Wednesday, the Chairman of the Gas Committee (Mr. J. H. M'Gaul) said that the Local Government Board had sanctioned the expenditure of £20,162 for the purchase of water-gas plant. The period in which the money must be repaid is 23 years; 10 years being allowed for the repayment of £600 borrowed for other extensions at the gas-works.

Gas Fatality at Cardiff.—A verdict of "Death from misadventure" was returned by a Cardiff Coroner's Jury who inquired into the death of Mary Marks, the thirty-year-old wife of a clerk, who was asphyxiated by gas. She had for some time suffered from weakness and depression; and one morning her husband going to see if she was all right, found her dead in bed. The gas-bracket (the tap of which was partly turned on) was near the window-curtains; and the supposition was that deceased, in endeavouring to obtain more daylight, had pulled back the curtains, which had caught the gas-tap.

Monte Video Water-Works Company, Limited.—The ordinary general meeting of this Company was held on March 22—Mr. J. Anderson in the chair. In moving the adoption of the report, noticed last week (p. 822), the Chairman said it was a matter of great satisfaction to the Board that they had this year seen their way to recommend an increase in the dividend from 7 to 8 per cent., in view of the steady progress of the Company's business and profits; and also bearing in mind that their big extension works were now completed, and that they had no further capital expenditure of a serious character to meet for a considerable time. The number of new customers secured during the year was 1983, or 12 per cent.; and the increase in their gross income was £12,255, or 10 per cent. The approximate cost of the additions to the plant was £251,000, of which the new 30-inch steel pumping main accounted for £172,000. A further reduction of 4c. per cubic metre in the price of water would be granted to those who paid on the maximum scale when the number of their customers had reached 20,000 and had remained at this figure for twelve months. Their relations with the authorities continued to be very satisfactory. The report was adopted.

MISCELLANEOUS NEWS.

ROCHDALE GAS-WORKS EXTENSIONS.

Council Approve Installation of Glover-West Vertical Retorts.

At last Thursday's Meeting of the Rochdale Town Council, the recommendations of the Gas Committee for the installation of vertical gas-retorts on the Glover-West system, together with other improvements at the gas-works, were approved.

Mr. WALKER, the Chairman of the Gas Committee, explained to the meeting that the estimated cost of the installation (exclusive of foundations and chimney) was £18,085; and he proceeded to give particulars as to the Glover-West system of vertical retorts. He made special reference to the minimizing of the emission of smoke and steam by the system, and the avoidance of the necessity of any exposure of the men to the heat of the retorts—adding that a similar installation had given full satisfaction at St. Helens and was now being adopted by the Manchester Corporation. It was beyond question, he said, that considerable economies would be effected with this plant—not only in fuel and labour, but in the quantity of gas which could be produced. The scheme met with the hearty approval of Mr. Ball, their Gas Manager; and the Committee were satisfied that there were solid economic advantages which warranted them in recommending the scheme. "Having met many of the principal and noted men in the gas industry," continued Mr. Walker, "I believe that among a community of gentlemen who are enthusiastic, earnest, and fully alive to everything down to the smallest detail concerning gas making, Rochdale has in Mr. Ball an Engineer who is the equal of any of them."

Mr. OGDEN, who seconded the confirmation of the Committee's minutes, expressed the opinion (from what he had seen at the different works) that the system of vertical retorts would be rapidly adopted at other places, as it was more cleanly and economical than the old system.

In answer to a question, Mr. WALKER said the estimated cost for the whole scheme—including the building of the new retort-house—was £25,500, which would have to come out of reserve and revenue.

Mr. BLOMLEY, while supporting the Committee's recommendations, said that the fact that the new system would do away with probably 75 per cent. of the manual labour at the works was a serious matter in these distressing times; for it meant that the men discharged would either join the ranks of the unemployed or have to find work in some other occupation. At the same time, he admitted that the conditions of labour under the new system would be vastly improved.

BRISTOL GAS COMPANY'S BILL.

Municipal Opposition Ceases.

At a Meeting of the Bristol City Council to-day (Tuesday), the Parliamentary Bills Committee will advise the Council to allow the Gas Company's Bill to proceed without opposition. This is the outcome of a compromise. One of the chief factors in bringing it about was the withdrawal by the Company of the clause relating to the formation of a second reserve fund. The Committee objected to the removal of the restriction upon the presence of sulphur in the gas, to the reduction of the illuminating power from 14½ candles to 14 candles, and to the proposed new method of testing the gas. As Parliament does not now require gas companies to remove sulphur impurities from their gas, and in view of the other two points being in accord with the Model Gas Bill, the objection fails. The Company will amend the clauses in the Bill relating to neglect or refusal to supply gas, and to the repair of pipes by consumers, so as to comply in the one case with the Model Bill, and in the other to restrict the consumer's liability for defects of the service pipe between the boundary of his premises and the meter or the house. In all, six clauses are withdrawn, and among them that relating to the repeal in certain cases of the Company's obligation to supply gas for other purposes than light, and also the power of refusal to supply gas where the consumer has electric power, except upon payment of a minimum annual sum.

GAS-METER TESTING IN LONDON.

Report by Mr. James Stratford.

The Gas-Meter Inspector to the Corporation of London (Mr. James Stratford) has lately submitted to the County Purposes Committee his report for last year, from which we take the following particulars.

The Inspector commences with the statement that all the tests ordered by the Sales of Gas Act were applied to each meter; "great care being taken to ensure justice between the gas companies and the consumers, to correct the accidents of manufacture, and by certificates of actual consumption to decide disputes." He adds that "nothing has been neglected or strained with the purpose of showing a profitable return." The number of meters tested last year was 86,383, and the fees received amounted to £2580 14s., compared with 83,369 meters tested and £2533 14s. 6d. received as fees in 1908. There were 85,618 dry meters tested, ranging in size from 1250 lights to 1 light; the largest numbers being 10-light (11,246), 5-light (29,692), and 3-light (41,906). Of the 765 wet meters tested, 175 were 10-light, 418 were 5-light, and 88 were 3-light. The total number was divided thus: New, 32,728; repaired, 46,111; disputed registration, 7544. Last year 49,258 prepayment meters were tested; the total being made up as follows: 20-light, 3; 10-light, 515; 5-light, 13,463; 3-light, 35,244; and 2-light, 33. The following is a statement of the numbers of new and repaired meters rejected and returned to the makers for correction. These when returned correct were re-tested and stamped free of charge. Many of them were correct according to the Sales of Gas Act, but

would be rejected by gas companies, or cause trouble to the user and expense to the makers, who, Mr. Stratford says, "appreciate such supervision of their work." These numbered during the year 2564.

Fast in registration	656
Slow ,, ,,	1007
Passing unregistered gas	250
Leaky	309
Without stops (would work backwards)	68
No passage at ½-inch pressure	148
No passage (would not pass gas)	71
Defective lights (unsteady)	26
Other faults (including indices with defective mechanism, &c.)	54
Total of faults	2589

The following is a statement of the number and condition of disputed meters tested in 1909 (total 7544).

Found correct and re-stamped	1771
Correct registration, with other faults	887
Total correct	2658
Fast in registration	1430
Slow ,, ,,	1905
Total wrong	3335
Ceased to register	1485
Passing part of gas unregistered	1536
Leaky at index	1862
Defective indices (including hands out of place)	101
Other faults	988
Total of faults recorded	9307

Disputed Meters Fast in Registration.

Under 4 per cent. fast	762
Over 4 per cent. and under 7 per cent. fast	526
,, 7 ,, ,, 10 ,, ,,	95
,, 10 ,, ,, 20 ,, ,,	42
,, 20 ,, fast	4
	1430

Greatest error, 32 per cent. fast.

Slow in Registration.

Under 5 per cent. slow	465
Over 5 per cent. and under 10 per cent. slow	574
,, 10 ,, ,, 20 ,, ,,	554
,, 20 ,, slow	311
	1905

In the course of his closing remarks, the Inspector says: "Some gas companies have well-fitted testing-rooms, and meters removed from their mains are taken first to district offices, from there by van or otherwise to the gas-works, and are tested before sending to the gas-meter inspectors. The meters so carried from place to place are then put under various tests, and may be quite altered in registration from their condition when removed from the premises of consumers, who may be at a great disadvantage from this cause. I submit that the officially appointed inspector should first test the meter, as soon after its removal from work and with as little disturbance by carriage as possible. Any advantage that may have been taken of the Sales of Gas Act by various gas companies in surcharging on the inspector's certificate would be safeguarded by an order for the periodical testing of all gas-meters, so that the dated official stamp would be legal for a period of seven years only, with the option of earlier testing where necessary. This would be a reasonable time for an automatic machine to work, and much longer than other measuring machines are used without examination by appointed officials."

On the subject of the testing of meter indices, he says: "The Sales of Gas Act has no provision for testing the correctness of gas-meter indices beyond the test dial, and a satisfactory method is needed before such testing can be effectively carried out, as to ensure certainty each index must be carefully tested by an expert before being fixed in the meter by the maker. Not only the wheels of the index, but the templet of the dial, the position of the dial, the index hands, and pinions must be examined to ensure correct working at all points of the dial; making this a very difficult work. The mechanical errors are very few, and with improved methods of manufacture and machinery in use, are now barely possible, and no question of fraud has ever been suggested. The testing would cause a burden of many thousands of pounds upon gas consumers or ratepayers; and the public have had no cause to desire such testing."

Handsworth Water Supply.—Hitherto the Sheffield Corporation have supplied water in bulk to the Handsworth Urban District Council; but it is now proposed that, with the concurrence of Handsworth, Sheffield should distribute the water as well as supply it. The change would involve a Provisional Order to sanction the arrangement, and the raising of a loan of £3229 by Sheffield for the purchase of the Handsworth undertaking. The matter was the subject of a local inquiry by Major Norton and Dr. R. C. Maxwell, two of the Board's Inspectors, a few days ago.

Extension of Water-Mains at Long Eaton.—At the Zion Hall, Long Eaton, last Thursday, Mr. C. Clifton, M.Inst.C.E., held an inquiry, on behalf of the Local Government Board, with respect to an application by the Urban District Council to borrow £1000 for water-mains for new streets. Mr. E. Williams, the Clerk to the Council, stated the case briefly, and submitted figures showing the area of the district, population, &c. He asked for the longest possible period for the repayment of the loan. The question of the town's liabilities and the present source of water supply, which the Surveyor (Mr. F. Worrall) said was better than it had been for the last six years, was gone into. There was no opposition to the application.

LINCOLN CORPORATION GAS SUPPLY.

Profits Relieve the Rates.

At the Meeting of the Lincoln City Council last Tuesday, it was reported that the Gas Committee had resolved that a sum of £3000 should be contributed out of the revenue of the gas undertaking in aid of the general district rate for the year ending March 31, 1911; and the Committee recommended that the resolution be confirmed.

Alderman WALLIS, the Chairman of the Committee, said they started the past year with a balance of £402, and their profits for the year were approximately £5036, after paying interest on stock, sinking fund, bank interest, &c. Out of this, £1500 was allowed for finishing the new purifiers; leaving a balance of just over £3000. If they gave £3000 to the rates, it would leave them just about in the same position as last year—with something like £400 to be carried forward. They had spent during the year £1700 on new meters and cookers; and up to now the Committee had paid for everything out of profits. They had something like 4000 cookers and a large number of meters.

Mr. TEESDALE inquired how many slot-meters there were in use.

Mr. JOHN CARTER, the Gas Manager, replying, stated that the slot-meters numbered 1900, and the last time they cleared them the amount was just under £1000.

Mr. MILLS asked if the Chairman of the Committee would consider the question of the abolition of cooker-rents, as he was sure it would handsomely pay them if they did so.

Alderman WALLIS said he was satisfied, as he had previously been, that it would be a very great mistake to abolish the rents; and he believed the Committee were of the same opinion. The citizens were perfectly satisfied with being allowed to use the cookers free for six months of the year, and he thought the abolition of the rents would cause a waste of income. People would be wanting fresh cookers instead of cleaning up the ones they had.

The recommendation of the Committee was adopted.

ST. MARY CHURCH GAS-WORKS.

Methane-Hydrogen Plant—Gas Manager's Salary.

Mr. F. Chalmers, the Manager of the St. Mary Church Gas-Works, submitted to the Torquay Town Council yesterday week a report on the new methane-hydrogen plant which has been installed at the works. He stated that the cost of gas into the holder was a fraction over 1s. per 1000 cubic feet; and this figure would be reduced. A better price was being obtained for coke, which now sold at 10d. per cwt. The introduction of the new plant would materially reduce the consumption of coal; and it was probable all the coal required could be obtained locally as screenings, without entering into contracts. Last year 3000 tons of coal were consumed; the average price being 16s. per ton. Now only 2000 tons would be required; and it could be purchased at from 12s. 6d. to 13s. 6d. per ton. By the new plant, it was possible to make either a large or a small quantity of gas economically. Less money would be needed for repairs; while the productive capacity of the works was increased by 75 per cent. The Gas Committee recommended that for his services in connection with the installation of the plant and his extra work, a grant of £75 be made to him, and that his salary should be increased by £25 at once, and by a like sum at the end of twelve months. It was stated that the maximum salary for which Mr. Chalmers was appointed was reached two years ago, and that since then his work and responsibility had been considerably extended. The recommendation was adopted.

PROTECTION OF WATER SUPPLIES.

Proposed Legislation.

As already mentioned in our "Parliamentary Intelligence," a Bill introduced last session, but not proceeded with, to determine the rights and liabilities of persons supplying water under the authority of Parliament in certain cases, has been brought forward again in the House of Lords, and referred to a Joint Committee of the two Houses. The provisions of the measure were noticed in the "JOURNAL" last year; but, in view of its importance, we reproduce the principal clauses.

By clause 3, no authorized undertaker shall, after the passing of the Act, sink any well upon, or construct any other works for taking or intercepting water from, any land, unless the works and lands on which they are to be constructed are specified in an Act of Parliament.

Clause 4 sets forth that if any private water supply situate within any protected area, as defined by the Act, shall be diminished or injured subsequently to the construction or enlargement, after the passing of the Act, of any works of an authorized undertaker, he shall (in default of proof that such diminution or injury has not been caused by such works) make full compensation for it, and for any loss or damage occasioned by it, to the owner of such supply, and to all persons entitled to use the same. The compensation may be by money payment or by the reinstatement or improvement of the water supply or by affording a new supply, or partly by one and partly by another or others of such methods as, in default of agreement, may be determined by arbitration as subsequently provided. For the purposes of this section, authorized undertakers are to have power to supply water outside their limits, and to execute and do all such works and things as may be necessary. Any difference or question arising under the section is to be determined by arbitration in manner provided by the Arbitration Act, 1889. Any award made by an arbitrator ordering the reinstatement or improvement of the water supply or the affording of a new supply may be enforced by *mandamus*.

Clause 5 deals with the right of supply in bulk from water in transit. It sets forth that where an authorized undertaker, by works constructed

or enlarged after the passing of the Act, takes water from, or conveys water through, any county district or any part of one for supply outside, the district council may demand a supply of water in bulk for use and for supply for use within the district or any part thereof; and the authorized undertaker is, subject as subsequently provided, to afford such supply, in such quantity, at such price, and upon such terms and conditions, as, in default of agreement, may be determined. It is provided that such water is not to be used or supplied for use in the part (if any) of the county district that is within the limits of supply of any authorized undertaker, not being the one on whom the demand is made, except with his consent in writing, which consent is not to be unreasonably withheld.

Any difference or question arising under the preceding section is to be determined by the Local Government Board, who are to hold an inquiry into the subject-matter, at which all parties concerned are to be entitled to be heard; and the Board, after holding the inquiry and considering all the circumstances of the case, may make such order as they think fit. Any such order may (in particular) determine all or any of the following matters, so far as they or any of them are in question: (*a*) Whether a supply of water is or is not to be afforded under the section, and in the former case in what quantity, at what price, and upon what terms and conditions; (*b*) whether any consent required is or is not being unreasonably withheld, and may dispense with such consent either absolutely or upon terms; and (*c*) how the costs of any of the parties attending the inquiry shall be borne. The provisions of sections 294-6 of the Public Health Act, 1875, are to apply to inquiries and orders under the section. Any order made by the Local Government Board may be enforced by *mandamus*.

Clause 6 specifies that, except so far as is expressly provided, nothing in the Act is to operate to relieve any authorized undertaker from any obligation or disability, or from any action, suit, claim, demand, or liability to which but for the passing of the Act he would be or become liable.

The Act is to be cited as the Water Supplies Protection Act, 1910; and it is not to extend to Scotland or Ireland.

PROPOSED SMOKE ABATEMENT BOARD.

The Smoke Abatement League are memorializing local authorities in support of a petition to the Local Government Board with the view of having made applicable to the whole country the provisions for the control of smoke which are embodied in a Bill of the London County Council. The following are some of the objects of the League, as set forth in the petition: "We suggest the creation of a Smoke Department of the Local Government Board, with inspectors who should be competent men with scientific training, paid as such, experts in the chemistry of fuel and combustion, and with some knowledge of mechanical engineering also. We desire to remove, so far as public action can, the domestic smoke nuisance also; and for this end we would propose that, after a reasonable delay, all new fireplaces should be inspected and passed, as drains and plans are. There is a great difference between the smoke-producing qualities of good and bad grates. Believing that cheap gas will be a large factor in the ultimate solution of the smoke question, we trust that the Board, in dealing with the borrowing powers asked for by gas undertakings, will absolutely prohibit the pernicious practice of selling gas dear to relieve the rates. This leads to wasteful expenditure, is unfair to large users of gas, and prevents the development of this clean and civilized way of obtaining heat and power."

Gas Explosion at a Soap-Works.—An explosion of gas caused a good deal of damage a few days ago at the Portsmouth Soap-Works of Messrs. Doudney and Co. A bracket had been removed in the office, which became filled with gas owing to the tap in the main having been turned on without any intimation being given of the fact. An employee named Craven took steps to clear the office of gas after stopping up the leaky bracket; but this had not been effectual when he struck a match. The result was that the windows and doors were blown off, and Craven sustained such injuries about the head that he had to be medically attended at the local hospital.

Dartmouth Gas Company.—Mr. R. W. Prideaux presided at the recent annual meeting of this Company. It was reported that the new washer and scrubber, the new sulphate plant, and other additions to the works, had been in use for about six months, and had given satisfactory results. The accounts showed receipts to the amount of £4811 and expenditure of £4103; the profit balance being £708. Both receipts and expenditure were rather less than last year, owing to the lower price obtained for residuals and the amount paid for coal. There are 769 prepayment meters and stoves in use—an increase of 64. It was decided to pay a dividend of 9s. per share.

Exmouth Gas Company.—In the report presented at the recent annual general meeting of this Company, the Directors stated that there had again been a satisfactory increase in business, which fully justified the forward policy of which the Company's Bill now before Parliament was evidence. The accounts showed a credit balance of £4477; and after payment of the usual dividends, there would be £3627 to pay interest on the debenture stock, preference shares, &c. The Chairman (Rev. C. R. Carr), in moving the adoption of the report, remarked that the increase in the receipts was very encouraging, in view of the large extension of works which had been recently undertaken. When the scheme was completed, they would be capable of meeting the demand for gas for a long time to come without unfair and wasteful pressure upon the plant, and extra labour and anxiety to those in charge. The works had not for many years been in a proper condition to meet all requirements. Mr. L. D. Thomas, a Director, said the sale of gas had increased year by year; and when the mains were extended to Lympstone and Woodbury, as was proposed by the Bill, the Company would have a new area to draw upon for customers. The report was adopted, and the dividends of 10 and 7 per cent. upon the different classes of shares recommended therein were declared.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Informal Meeting of Scottish Gas Managers—already the twenty-seventh of the series—which was held in Glasgow on Wednesday, underwent trials the outcome of which is to establish the gathering upon a basis more secure than it has ever occupied. The first of these trials was the declinature of Mr. J. Ballantyne, of Hamilton, to take up the post of President. Mr. Ballantyne was nominated last year in his absence; and evidently his tastes do not lie in the direction of public life. To get out of the difficulty, the Convener of the meeting—Mr. W. B. M'Lusky, of Perth—to whom the greatest credit must be given for the success of the gathering, fell back upon the expedient of asking Mr. D. Vass, of Airdrie, who was President at last year's meeting, to continue in office. Mr. Vass was sufficiently loyal to the cause of the gas industry to agree at once to the request. But then there arose the second trial. Mr. Vass must be presumed to have delivered himself of his best in his last year's address; and it might have been jeopardizing the success of the meeting to have asked him to prepare another address and submit it for the informal knocks which abound at the spring meeting. It was felt, too, that it would be scarcely fair to Mr. Vass to ask him to submit to the ordeal a second time in succession. Mr. M'Lusky got out of this difficulty by asking the Engineers of the three largest gas undertakings in Scotland to submit short notes upon subjects of which they have made a special study—the President to do the same. The scheme was so exceedingly well devised that, when the gentlemen approached consented to take up the subjects allotted to them—which each of them graciously agreed to do—the success of the meeting was no longer in doubt. There was then the question of the trading element. The Informal Meeting had, till this year, been exceedingly free in the admission of all who thought they had an interest in coming. Following the trend of events in other quarters, Mr. M'Lusky resolved upon the step of endeavouring to confine the business of the meeting to those who are managers or assistants, or members of Junior Gas Associations, among the latter of whom are clerks in gas offices, and the like. Not to be too exclusive, however, he allowed the introduction, as visitors, of directors of gas companies or members of corporation gas committees, and principals or managers of engineering or other concerns connected with the gas industry; this being the restrictive qualification now laid down by the North British Association. The step was a bold one to take; but its entire success altogether justified its being taken. The number of gas managers and other duly qualified persons attending was, if not the largest, considerably above the average; and the discussion upon the papers was, in every way, all that could be desired. Of the papers themselves, they all dealt with subjects which are of the first interest at the present time. But another, and a most extraordinary and unlooked-for, trial arose at the end of the day, when it was announced that the Committee of the North British Association had that day decided to make the proposal that the Informal Meeting should be taken over by the Association. The extraordinary part of the proposal was that no reasons were given for it; and when this was pointed out, it was replied that it was intended that the Informal Meeting should find reasons for the annexation. This is not the usual way of doing business; and, indeed, it was so unusual that it failed in its object. The gentlemen assembled could find no reason why their highly-prosperous gathering should be handed over to other administration; and they, without a vote, rejected the proposal. There is some speculation as to the reason for the proposal being made. It was banteringly remarked in the meeting that it was probably the President's badge and chain of office which it was sought to annex. This was probably not a reason which weighed with the Committee. The probability rather is that they wished to strengthen the North British Association; and possibly the success which has attended the Junior Gas Association was the heaviest moving power in the matter. The proposal that the Informal Meeting should be administered by the North British Association was advocated by me years ago. It did not find favour then; neither did it do so four years ago, when Mr. Vass made the same proposal. The situation is now altered, if in no other way by the institution of the Junior Association. It was probably not considered by the Committee of the North British Association that the Junior Association admits to its membership gentlemen who would not be eligible for membership in any class of the North British Association. These would have been either excluded from the Informal Meeting or admitted by favour—a few of them, probably, who might be qualified, becoming associate members of the North British Association. On all counts, the rejection of the proposal was, in the meantime, the right course to take. If circumstances alter, the proposal can be brought forward again. The point to be noted is that managers assembled in an informal manner have resolved, notwithstanding that their proceedings were this year more formal than usual, to maintain the informality of the spring gathering, which, to many, is the charm of the meeting; the business being got to at once.

The joint meeting of the Eastern and Western Districts of the Scottish Junior Gas Association at Falkirk to-day was as happy in realization as it was in conception. The members fraternized together as became colleagues in the same cause. Everyone was delighted with the appearance of the gas-works at Falkirk, which are, as was described by Bailie Bogle, of the most up-to-date description. The Corporation are proud of their works and of their Engineer. The members of the Corporation who were present very courteously received and entertained the Association; and the juniors were highly gratified at their reception.

It will be remembered that it was proposed to hold an exhibition of gas appliances on an extensive scale in Glasgow in the course of the past winter, but that the proposal had to be abandoned, as, on account of the General Election, it was impossible to find a place in which to hold the exhibition. A Sub-Committee have been on the look-out for premises which would be suitable for the event, and it is announced that they have secured, for not less than a month from about the middle of September, the structure in Victoria Road, South Side, occupied by the American Roller Skating Rink. The Corporation have agreed to this, and have empowered the Committee to make arrangements for holding the exhibition. Last Monday an exhibition of gas

appliances held under the auspices of the Corporation of Glasgow, was opened in the public hall at Muirhead. The Corporation gas-mains have recently been extended to the villages of Muirhead and Chryston. In opening the exhibition, Dr. Lamont said he had already proved gas to be a cleanly and most efficient fuel, besides being only about half the cost of oil, his previous illuminant. Bailie Kirkland expressed his pleasure at the fact that, although the mains had been laid only a few weeks, already between 60 and 70 gas-cookers had been installed. Cookery demonstrations were given during the week by Miss E. M. Dods, late Principal of the Dundee School of Cookery.

The death occurred in Grangemouth on Saturday last of Mrs. White, the wife of one of the Magistrates of the burgh, from injuries sustained in an explosion of gas nearly a fortnight before.

A new petrol air-gas plant, the design of Mr. Walter Simpson, has been fitted up in the Loirston Hotel, Ballater. The system has been patented by Mr. Simpson; and is known by the name of the "Britannia" safety air-gas plant. A small hot-air engine, using part of the gas produced, supplies the power. The rising of the gasholder puts a stop to the manufacture of gas, and its fall starts it again. It is claimed that the gas is non-explosive; the quantity used being so small in relation to the quantity of air that the gas will not light unless with a mantle for incandescent lighting, or in a bunsen burner for cooking and heating. About 60 burners are supplied. The gas may be used also for cooking and heating. There is no public gas supply in Ballater.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *April* 9.

Sulphate of Ammonia.

Notwithstanding the decrease in the output from gas-works at this time of the year, demand has hardly been sufficient to absorb current production, and an easier market has again to be recorded. The inquiry for home consumption continues good; but there is still a paucity of new export orders, and the week closes with values reduced to £12 2s. 6d. per ton f.o.b. Hull, £12 3s. 9d. to £12 5s. per ton f.o.b. Liverpool, and £12 6s. 3d. per ton f.o.b. Leith. In the forward position, no further transactions are reported; but makers maintain a firm attitude, and refuse to quote less than £11 17s. 6d. per ton f.o.b. at the best ports for equal monthly quantities July-December, 1910.

Nitrate of Soda.

The tone is rather firmer again, but quotations are unchanged at 9s. 9d. per cwt. for ordinary, and at 9s. 10½d. for refined quality, on spot.

LONDON, *April* 11.

Tar Products.

The markets for tar products remained firm during the past week. Pitch has shown further signs of improvement. The demand for solvent continues, and makers are very firm in their ideas of price. The majority are very well sold to the end of the year, and are asking as much as 1s. 6d. for any surplus. Crude carbolic acid consumers are offering 1s. per gallon on the east coast, but makers do not feel inclined to sell even at this figure. Creosote is steady.

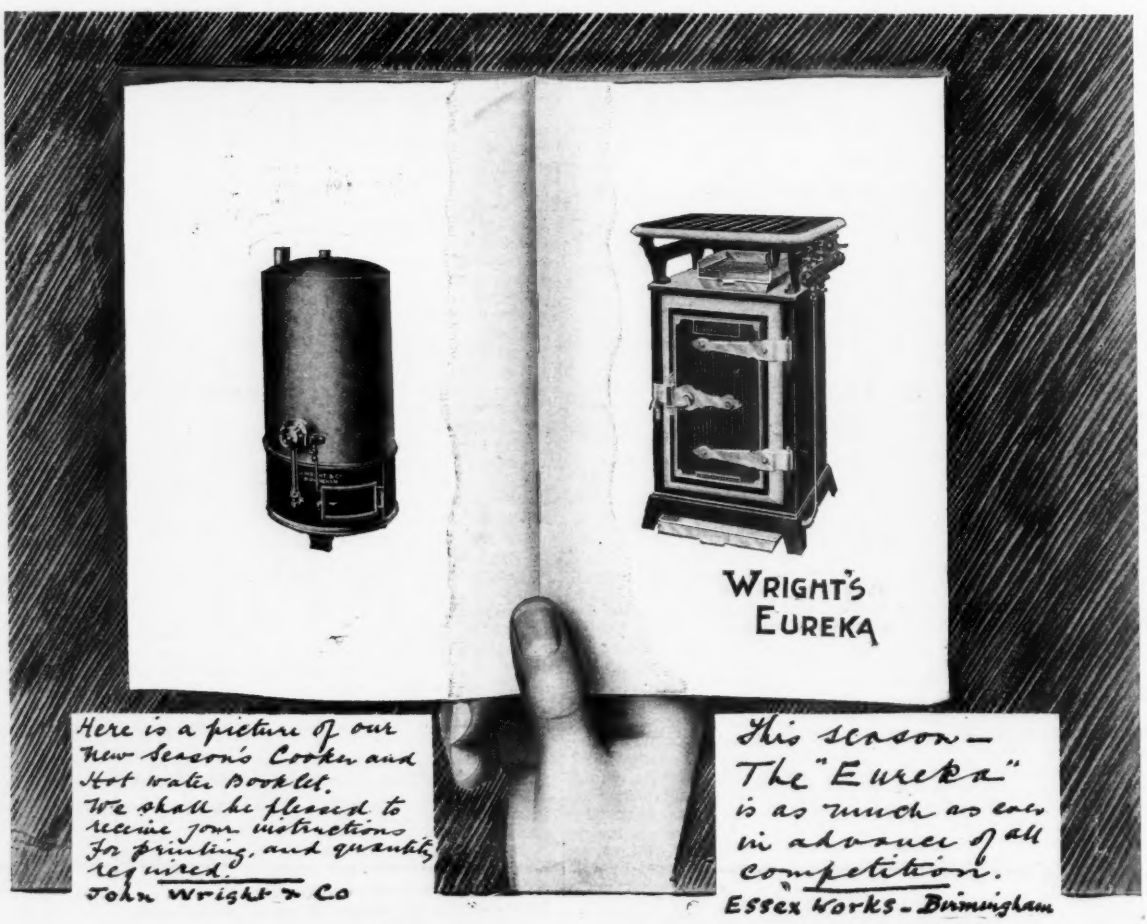
The average values during the week were: Tar, 16s. 9d. to 20s. 9d., *ex* works. **Pitch, London,** 33s. 6d.; **east coast,** 33s. 6d.; **west coast,** 32s. 6d. to 33s. 6d. f.a.s. Mersey ports, 33s. 6d. f.o.b. others. **Benzol,** 90 per cent., casks included, **London,** 8d.; **North,** 8d.; 50-90 per cent., **London,** 9d.; **North,** 9d. **Toluol, casks included, London,** 10½d.; **North,** 10d. to 10½d. **Crude naphtha, in bulk, London,** 4¼d. to 4⅜d.; **North,** 4d. to 4⅛d.; **solvent naphtha, casks included, London,** 1s. 3½d. to 1s. 4d.; **North,** 1s. 3d. to 1s. 5d.; **heavy naphtha, casks included, London,** 1s. to 1s. 1d.; **North,** 11d. to 1s. **Creosote, in bulk, London,** 2½d. to 2¾d.; **North,** 2d. to 2½d. **Heavy oils, in bulk,** 2¾d. to 2⅞d. **Carbolic acid,** 60 per cent., **casks included, east and west coasts,** 1s. **Naphthalene,** £4 10s. to £8 10s.; **salts,** 40s. to 45s., **bags included. Anthracene, "A" quality,** 1¼d. to 1⅜d. **per unit, packages included and delivered.**

Sulphate of Ammonia.

Although the market remains steady, buyers do not feel inclined to pay to-day's prices, but the majority of makers report that they are well sold for the next month or two, and therefore are not anxious sellers to-day. Actual Beckton is quoted at £12 10s.; and outside makes upon Beckton terms at £12 5s. In Hull, £12 3s. 9d. is asked; and in Liverpool, £12 5s. to £12 6s. 3d. In Leith, £12 7s. 6d. is quoted; and in Middlesbrough, £12 3s. 9d.

Automatic Lamplighting at Bournemouth.—The Lighting Committee of the Bournemouth Corporation have lately had before them the question of the automatic lighting of the public lamps. The matter came up on the report of a Sub-Committee who had considered offers from Messrs. Alder and Mackay and from the Company who now hold the lamp-lighting contract, and also a report by the Outdoor Lighting Inspector. After very full consideration of all the information before them, they decided to recommend the Council to enter into a fresh agreement with the Company, on terms which are to be subsequently settled.

Keighley Water-Works Extension.—The Keighley Town Council have passed a series of resolutions instructing the Town Clerk to take the steps necessary to obtain possession of lands in the Sladen Valley, near Stanbury, required for the construction of two new reservoirs; appointing Mr. James Watson, the Bradford Water Engineer, as Consulting Engineer, and Mr. Ratcliffe Burnett as Resident Engineer; and empowering the Water Committee to make arrangements for the commencement of the new works. Mr. B. S. Brigg said the resolutions marked the beginning of a very important, lengthy, and costly undertaking. If commenced at once, the works would probably occupy quite eight years.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This season — The "Eureka" is as much as ever in advance of all competition.
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COAL TRADE REPORTS.

Northern Coal Trade.

The coal trade is active; but prices have fallen for some kinds of coal since it was known that work at the collieries would be increased. The fall is chiefly in the steam coal trade. Best Northumbrians are down to about 11s. 4½d. per ton f.o.b. For second-class steams, the price seems steady at from 10s. 6d. to 11s.; and steam smalls are quiet at from 6s. to 7s. 6d. The work is fuller now at the collieries; but the opening of the Baltic will soon help to increase the demand for export. In the gas coal trade, the request is steady; and the price of Durham gas coals varies, according to quality, from 10s. 3d. to 11s. per ton f.o.b. for the usual classes, and up to 11s. 6d. for "Wear specials." The home demand is rather less than it was, but exports are fuller. In regard to contracts, some for Paris have been settled—about 150,000 tons, it is said, over two years, of best sorts, and 60,000 tons of seconds, at prices somewhat near those that are current. It is reported that there have been begun negotiations for the great London coal contracts; but little as yet seems to be known about this, and it is believed that tolerably full stocks will prevent any hurry over such negotiations. Coke is steady; and good gas coke is quoted at from 14s. to 14s. 3d. per ton f.o.b. in the Tyne or Wear.

Scotch Coal Trade.

Trade has the appearance of being easier, splint particularly having been on sale at a little less than last week's quotations. Ell has been in fair request, and the price steady. The prices now quoted are: Ell, 9s. 9d. to 10s. 3d. per ton f.o.b. Glasgow; splint, 10s. to 10s. 6d.; and steam, 10s. to 10s. 6d. The shipments for the week amounted to 365,776 tons—an increase of 36,247 tons upon the previous week, and of 90,024 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,771,901 tons—an increase of 658,060 tons upon the corresponding period.

Penkridge Water Supply.—The Cannock Rural District Council having applied to the Local Government Board for sanction to borrow £4800 for works of water supply for the township of Penkridge (including the execution of works in the parish of Teddesley Hay), an inquiry was held last Wednesday, at Penkridge, by Mr. Courtenay Cliff, M.Inst.C.E., one of the Board's Inspectors. The Clerk to the Council (Mr. A. W. Carver) submitted particulars as to their proposals; and Dr. Reid, the County Medical Officer of Health, gave evidence as to the necessity for an alteration of the existing condition of things. The application was opposed by ratepayers on the ground that a supply of water could be obtained from the South Staffordshire Water Company at a cost of 3d. per house, compared with 5d. under the Council's scheme. Witnesses were called in support of the opposition; and the inquiry closed.

Gas in the Laundry.

The Laundry Exhibition held at the Agricultural Hall, Islington, last week, afforded evidence that gas has steadily increased in favour for heating appliances connected with rotary ironers; and there are very few laundry engineers who have not adapted it for shirt and collar machines and for calendars. The firm of Appleyard, of Bradford, exhibited a five-roller ironer, each roller under atmospheric gas. Other firms showed starch-boilers, soap-tanks, polishing irons, goffering-machines, and collar-presses, all being worked without atmospheric blast. These were mostly the production of the Cork Gas Engineering Company, of Rosebery Avenue. A new iron by Messrs. Wallwin and Co., of Salford, was one closed in, and with a perfect combustion chamber.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards placed three new issues of capital by order of Directors. The first lots in the particulars of sale consisted of £10 shares and 4 per cent. perpetual debenture stock of the Lowestoft Water and Gas Company. The shares rank for a maximum dividend of 7 per cent., and the last one paid on similar shares was at the rate of 5¼ per cent. They were all sold at from £10 5s. to £11 5s. each; and the debenture stock fetched from par to £102 per £100. Some consolidated ordinary stock of the Worthing Gas Company was placed at from £103 10s. to £104 10s. per £100. The other new issue was £32,000 of 4 per cent. perpetual debenture stock of the Alliance and Dublin Consumers' Gas Company; and it realized prices ranging from £95 to £96 10s. per £100. On the same occasion, Messrs. Richards sold a small quantity of "A" stock of the Horley District Gas Company, ranking for a standard dividend of 10 per cent. per annum, subject to the sliding-scale (the last dividend having been at the rate of 5 per cent.), at £101 to £104 per £100. Next day, Messrs. H. W. Watson and Son sold at Renishaw 59 £1 shares in the Eckington and Mosbro' Gas Company at £1 13s. each, and a few £5 shares in the same Company at £6 10s. apiece.

Salaries in the Manchester Corporation Departments.—The Special Committee appointed by the Manchester City Council to inquire into the conditions of service of employees in the different departments have drawn up some important recommendations. With regard to men in the gas-works and other departments, it is recommended that those with more than six months' service be paid half wages for one month in case of sickness, after which each case will be dealt with on its merits. The following holidays, with full pay, are recommended: The four Bank Holidays, Christmas Day, and Good Friday. The Committee express the opinion that it is not desirable to establish an eight-hour day for the Corporation workmen.

APRIL

THE MONTH FOR "SPRING CLEANING."

Spring is also the time when a Gas Engineer can "wake up" his customers to "Cook by Gas."

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LONG DAYS and SHORT NIGHTS diminish lighting output.

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Gas-Workers' Wages at Leeds.—The Leeds Gas Committee have passed a resolution adopting the following recommendations of a Consultative Committee respecting the wages of various employees: 2d. per shift advance to chargers (inclined retorts), drawers, firemen (on inclined retorts), attendants (machine work), firemen (machine work), stokers (handwork), coal wheelers (handwork), purifiers, yardmen, and coke fillers, coke slackers, and firemen (handwork); 3d. per shift advance to coke-wheelers; 1d. per shift advance to machine-men; and 1s. per week advance to various meter and stove repairers and cartmen. Applications of enginemen, boiler-firemen, and scurfers at the works, and a packer and some labourers in the meter and stoves department were not acceded to.

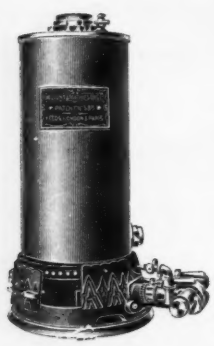
Public Lighting of Torquay.—Recommendations for improving the public lighting of the town were submitted to the Torquay Town Council yesterday week by a Committee. It was proposed to substitute a better kind of electric lamp for those now in use, and to convert 121 gas-lamps on the existing low-tension cable routes into electric lamps; also to replace the remainder of the ordinary flat-flame gas-burners by incandescents. A report by the Borough Surveyor showed that the total number of gas-lamps in the area of the Torquay Gas Company is 932, of which 233 are incandescent; and in the St. Mary Church district there are 213 gas-lamps, of which 92 are incandescent. During last year, 37 new lamps were put up, and 57 were converted to the incandescent system. The gas consumed was 9,787,000 cubic feet, compared with 9,946,000 cubic feet in the previous year. The total cost was £3896—an average of £2 7s. 5d. per lamp. The Council approved of the alterations suggested; though a member remarked that the cost of the public lighting equalled a rate of 6d. in the pound.

Municipal Coal Supply and Gas Residuals Question at Leeds.—The question of the establishment of a municipal coal supply and the treatment of the gas residual products came again before the Leeds City Council at their meeting last Wednesday, on the following motion by Mr. Badlay: "For the purpose of securing information in regard to establishing a municipal coal supply department, and the effect such a revenue-producing public service would have in minimizing the burden of high rates, it is hereby resolved that a small Committee be elected by the Council to make the necessary investigations with a view to fully advising the Council on the matter, a report of such investigations to be presented to the Council as early as possible. Further, that the Committee be authorized to report upon the methods of dealing with bye-products in the Gas Department, and state the estimated cost of establishing plant to deal with the same, instead of, as now, supplying them to private manufacturers." Mr. Brown contended that it would not be to the advantage of the city to set up a municipal coal supply, or, as he showed by a comparison of figures, to deal with the bye-products of the Gas Department. The Chairman of the Gas Committee, Alderman C. F. Tetley, urged that it was never intended that a Corporation should become a kind of co-operative stores, and that nothing could be gained by the Corporation turning themselves into manufacturers. The motion was defeated by 27 votes to 6.

Irish-Made Gas-Meters for Ireland.—At the weekly meeting of the Council of the Dublin Industrial Development Association on Monday last week, a letter was received from Mr. John Farren calling attention to the desirability of the Association getting into communication with the other Industrial Development Associations, with a view to their bringing pressure to bear on the different corporate bodies in their districts to specify for Irish-made gas-meters. Nearly all of them, the writer said, were being imported, while they could be made as cheaply and as well in Dublin. The Council decided to accede to Mr. Farren's request.

Proposed Joint Water Board for the Rhymney Valley.—The question of a Joint Water Board for the Rhymney Valley was again discussed at a conference which took place at Hengoed last Thursday. Mr. C. S. Goodfellow (Caerphilly) presided, and at the opening of the proceedings read a letter from the County Council, referring to section 35 of the Rhymney and Aber Valleys Gas and Water Company's Act of 1908, which, it was stated, was inserted at the instance of the Council, and provided, in effect, that if, in any of the next three available sessions of Parliament, any combination of local authorities within the county, with the consent of the County Council, should promote a Bill for an Act to constitute a Water Board with power to purchase the water undertaking, the Company would not oppose it except on details, and the purchase would be on arbitration terms. The "third session of Parliament" referred to would be the session of next year. Having emphasized the importance of immediate action, the Chairman said the longer they delayed the more the proposed Board would have to pay for the undertaking. It was ultimately resolved that the representatives should recommend the respective Councils to engage the services of a water engineer to prepare a report in regard to the sources of water, and that his fees should be paid *pro ratâ* by the Councils.

Instow Water Supply.—The Barnstaple Rural District Council have decided to support the scheme of the Barnstaple Water Company for the supply of water to Instow. The subject is one which has been under consideration for about twenty years, and recently the Local Government Board sent an Inspector to hold an inquiry into the merits of two proposals which have been submitted—one for a supply from Barnstaple, and the other from Northam. In the opinion of the Board, either scheme might be regarded as satisfactory. It was pointed out, however, that the Northam scheme would cost £4500, and the margin of borrowing powers of the parish would not be sufficient to permit of sanction being given to a loan of this amount at present. The estimate of the cost of the Barnstaple scheme was £6500; and the Company required a guarantee of 10 per cent. per annum on this amount, or £650. It was estimated £333 would be received from water-rates and meter supplies; leaving a balance to be met out of a special expenses rate in Instow of £317. One of the members of the District Council expressed the opinion that the cost of both schemes was prohibitive, but that of the two the Northam proposal was preferable, as the cost would be a diminishing one. The majority of the Council, however, approved of the Barnstaple proposal, which was said to be strongly favoured at Instow.



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1. **EASY FIXTURE**—to present Pipes.
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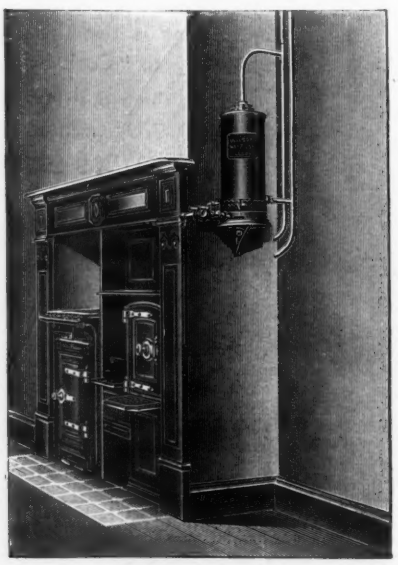

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Explosion Caused by Rats.—Considerable damage was done to a house in the main thoroughfare of Nenagh, Tipperary, late last Wednesday night by a gas explosion which investigation showed to have been caused by rats gnawing a pipe. Fortunately no one was seriously hurt.

Electric Light Question at Bishop's Stortford.—At the recent election for members of the Bishop's Stortford Urban District Council, the outstanding issue was the question whether the town should run its own electric light undertaking, or whether it should be left to the Gas Company to exercise in regard thereto the powers which their Bill will confer. It has now been practically settled; for of the fifteen members elected, nine at least are adverse to such a departure. These candidates received in all a total of 6183 votes; whereas for the six who may be taken as favourable to the scheme, only 3010 votes were recorded. Consequently, the majority of the Council as now constituted is against undertaking the supply of electricity in the town.

Swansea Gas Company.—At the recent annual meeting of this Company, the Chairman (Mr. J. Glasbrook), in moving the adoption of the report, referred to the very satisfactory results of the year's working, and said there had been an increase of upwards of 3 per cent. in the sales of gas in comparison with the previous year. He also touched upon the large extensions of mains at Llansamlet, Clase, and Cockett, and said that, with the view of meeting the desire of the District Council for further extensions, they had applied for a Provisional Order for carrying them out in the areas mentioned. He hoped an increase in the consumption of gas would result from the great expenditure the Company were being put to. The price of gas had been reduced, and was the lowest as yet reached by the Company—viz., 2s. 8d. for private, and 2s. 6½. for public lighting. There had been an increase of 1200 in the number of consumers during the year. A dividend at the rate of 5 per cent. per annum (less income-tax) was declared; and resolutions were passed expressing approval of the Directors, Engineer (Mr. G. Thornton Andrews), and staff.

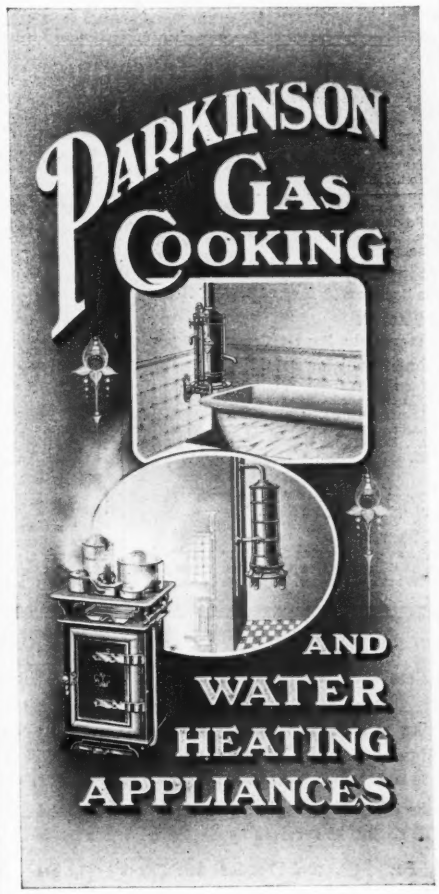
Leyland Water Supply.—Early last year a loan of £3160 was obtained from the Local Government Board by the Leyland Urban District Council for the purpose of laying a line of pipes to convey to their reservoir at Clayton-le-Woods a supply of water from the Thirlmere main of the Manchester Corporation. The work was commenced on the 1st of November last, under the supervision of the Council's Surveyor (Mr. M. H. Wilkinson); and it has just been brought to a successful conclusion. The event was celebrated last Wednesday, when the Chairman of the Council (Mr. J. W. Lomax) formally turned on the water, in the presence of a numerous company, who afterwards drank success to the undertaking at a dinner at the Queen's Hotel, Leyland. In the course of the subsequent proceedings, a silver-gilt replica of the key used for opening the meter-house was presented to the Chairman by the Vice-Chairman (Mr. T. Smith), on behalf of the members of the Council. It bore the following inscription: "Presented to J. W. Lomax, Esq., J.P., Chairman Leyland Urban District Council, on Connecting Thirlmere Water, April 6th, 1910.—From his Fellow-Members."

New Joint-Stock Companies.—The Chinley Gas Company, Limited, has been registered with a capital of £10,000, in £1 shares, to manufacture, sell, and supply gas in the parishes of Chinley, Bugsworth, and elsewhere in Cheshire. S. Foskett and Co., Limited, is the title of a Company registered with a capital of £1000, in £1 shares (divided equally as vendors' and ordinary), to carry on the business of manufacturers and vendors of atmospheric gas-heaters, &c. Under the title of Fuel Gas, Limited, a Company has been registered with a capital of £1512, in £1 shares, to carry on the business of manufacturers and generators of gas for light, heat, and other purposes, by the exercise (under a licence proposed to be acquired) of an invention relating to the vaporization of oil and other volatile substances, for which Mr. H. A. Kittle has applied for a patent, or by any other process. The Gas and Water Works Finance and Contract Company, Limited, was registered last Tuesday with a capital of £4000, in £1 shares (3000 preference), to "raise money by the issue of shares, and to invest the moneys so raised in the purchase of, or otherwise to acquire and hold, stocks, bonds, debentures, shares, scrip, or securities secured upon, or issued in respect of, any light or other illuminant scheme or undertaking." We do not know all the signatories; but one of them, at all events, is connected with two, at least, of the Eaton group of undertakings.

Mr. Fred T. Jeffery, son of Mr. Clark Jeffery, the Manager of the Tiverton Gas-Works, who has been in his father's office for the past three years, has been appointed by Messrs. Biggs, Wall, and Co. as their representative for the western counties.

About eleven o'clock last Friday morning, a gas explosion occurred in Hyde Road, Hoxton, by which two persons were injured. A gas-fitter, who had been erecting three lamps outside the shop of Mr. W. Byrne, a pawnbroker and jeweller, was about to test the lamps when the explosion took place, and a great mass of flames shot upward. Walter Dayson, a salesman, who was engaged on a ladder arranging some clothes outside the shop, was thrown to the pavement, and sustained injuries to his head; while a woman who was passing at the time was thrown to the ground, and had the back of her head cut. It is conjectured that gas had accumulated under the balcony of the window.

We have received from the Appleby Crane and Transporter Company, Limited (late Applebys, Limited, and the Temperley Transporter Company), of 58, Victoria Street, Westminster, Section "C" of their catalogue, in which will be found a fairly representative collection of the hand jib cranes in general use. They are most effectively illustrated, and are preceded by two pages of small views of electric and steam cranes and Temperley transporters. The illustrations are accompanied by descriptive particulars, and followed by the Company's copyright code for correspondence by telegram. Accompanying the section is a schedule of prices of the cranes shown. The wide scope of the Company's operations will be appreciated when it is mentioned that their complete catalogue contains twelve sections; and their half-century's experience in connection with all types of cranes enables them to satisfy all requirements.



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THE
PARKINSON STOVE CO., LTD.
(Incorporating Maughan's Patent Geyser Co.),

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Mr. W. L. Jackson, a former member of the firm of Messrs. W. S. Iles and Co., of No. 1, Monument Street, E.C., has joined the Board of Williamson Cliff Limited, of Stamford, and will in future represent the Company in London.

The Manchester Corporation Gas Department have placed with the Richmond Gas Stove and Meter Company, Limited, an order for the whole of their requirements for the next two years for gas-cookers for use with automatic meters.

Minutes of the Belfast Gas and Law Committees, appointing a Sub-Committee to confer with the Harbour Commissioners as to the acquisition of the Twin Island site for the proposed new gas-works have been adopted by the Council.

The Directors of the Oriental Gas Company, Limited, have resolved to pay an interim dividend at the rate of 3½ per cent., free of income-tax, on account of the year ending the 30th of June next. The dividend is at the same rate as last year.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

ENGINEER AND MANAGER. Nelson Gas Department. Applications by April 21.
SUPERINTENDENT OF PUBLIC LIGHTING. Calcutta Corporation. Applications by May 3.
GENERAL FOREMAN. No. 5216.
WORKING FOREMAN. Pembroke Dock Gas-Works.
WORKING FOREMAN. No. 5215.
GAS-FITTER. Bromsgrove Gas-Works.
FITTER. No. 5218.

Agencies Wanted by

Firm of Gas Engineers (Sydney, N.S.W.). No. 5217.

Situation Wanted.

SLOT COLLECTOR AND RENTAL CLERK. No. 5219.

Plant (Second Hand) for Sale.

RETORT-BENCH MOUNTINGS, WASHER-SCRUBBER, EXHAUSTER COMPENSATOR, STATION METER, PURIFIER CRANE, STEAM PUMP, COAL-TESTING PLANT, SULPHATE PLANT, &c., PIPE CONNECTIONS, BARROWS, AND TOOLS. Kilmarnock Gas Department. Tenders by April 26.

Meeting.

IMPERIAL CONTINENTAL GAS ASSOCIATION. Cannon Street Hotel, May 3, 2.30 o'clock.

Stocks and Shares.

ANNFIELD PLAIN AND DISTRICT GAS COMPANY. April 13.
BRYNMAWR AND BLAINA GAS COMPANY. April 30.
SOUTHEND WATER COMPANY. April 19.

TENDERS FOR

Benzol.

BRIDGEWATER COLLIERIES COKE-WORKS. Tenders by April 25.
DARWEN GAS DEPARTMENT. Tenders by April 23.

Boilers (Gas).

DARWEN GAS DEPARTMENT. Tenders by April 23.

Coal and Cannel.

BLACKPOOL GAS DEPARTMENT. Tenders by April 24.
DARWEN GAS DEPARTMENT. Tenders by April 23.
DENBIGH GAS AND WATER COMPANIES. Tenders by April 20.
ISLE OF THANET GAS COMPANY. Tenders by April 20.
LLANDUDNO URBAN DISTRICT COUNCIL. Tenders by April 30.
RHYL GAS DEPARTMENT. Tenders by April 27.

Fire-Clay Goods.

LIMERICK GAS COMMITTEE. Tenders by April 18.

Gasholder (Addition).

MORECAMBE GAS DEPARTMENT. Tenders by April 23.

General Stores—

(Brass and Copper Tube and Fittings, &c., Lime, Castings, Lead Gas Pipe).
DARWEN GAS DEPARTMENT. Tenders by April 23.
LEEDS GAS DEPARTMENT. Tenders by April 23.
WIGAN GAS DEPARTMENT. Tenders by April 18.

Incandescent Burners.

CALCUTTA CORPORATION. Tenders by June 6.

Lanterns.

CALCUTTA CORPORATION. Tenders by June 6.

Oxide.

LIMERICK GAS COMMITTEE. Tenders by April 18.

Pipes, &c.

DARWEN GAS DEPARTMENT. Tenders by April 23.
LEEDS GAS DEPARTMENT. Tenders by April 23.
WIGAN GAS DEPARTMENT. Tenders by April 18.

Purifiers, &c.

SOWERBY BRIDGE GAS DEPARTMENT. Tenders by April 25.

Retort Settings, &c.

LIMERICK GAS COMMITTEE. Tenders by April 18.

Sulphuric Acid.

BURY CORPORATION. Tenders by April 16.
WIGAN GAS DEPARTMENT. Tenders by April 18.

Tar.

COLNE GAS DEPARTMENT. Tenders by April 16.
DARWEN GAS DEPARTMENT. Tenders by April 23.
WIGAN GAS DEPARTMENT. Tenders by April 18.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

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All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

Telegrams: "GASKING, LONDON." Telephone: P.O. 1371a Central.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 93.

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,474,000	Stk.	Apl. 1	5	Alliance & Dublin Ord.	84 86*	..	5 16 3
310,000	Stk.	Jan. 13	4	Do. 4 p.c. Deb.	100—102	+2	3 18 5
200,000	5	Oct. 28	7†	Bombay, Ltd.	6⅞—6⅞	..	5 5 8
40,000	5	,,	2†	Do. New, £4 paid	5—5¼	..	5 0 8
50,000	10	Feb. 25	15	Bourne-	29—30	..	5 0 0
311,810	10	,,	7	mouth Gas	16½—16⅝	..	4 3 7
75,000	10	,,	6	and Water	15—15⅜	..	3 17 5
380,000	Stk.	,,	12½	Brentford Consolidated	251—254	+1	4 18 5
300,000	,,	,,	9½	Do. New	183—190	+1	5 0 0
50,000	,,	Aug. 12	5	Do. 5 p.c. Pref.	120—122	..	4 2 0
206,250	,,	Dec. 29	4	Do. 4 p.c. Deb.	101—103	..	3 17 8
220,000	Stk.	Mar. 16	11	Brighton & Hove Orig.	213—216	..	5 1 0
246,320	,,	,,	8	Do. A Ord. Stk.	152—155	..	5 3 3
469,000	20	Apl. 1	10⅝	British	44—45*	..	4 14 8
109,000	Stk.	Feb. 25	6	Bromley, A 5 p.c.	116—118	..	5 1 8
165,700	,,	,,	4½	Do. B 3½ p.c.	87—89	..	5 1 2
82,278	,,	,,	5½	Do. C 5 p.c.	104—106	..	5 3 9
55,000	,,	Dec. 29	3½	Do. 3½ p.c. Deb.	87—89	..	3 18 8
500,000	10	Oct. 14	7	Buenos Ayres (New) Ltd.	—	..	—
250,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	98—100	..	4 0 0
100,000	10	—	—	Cape Town & Dis., Ltd.	4—5	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	6—7	..	—
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	49—50	..	6 0 0
100,000	Stk.	Dec. 29	4½	Do. 4½ p.c. Deb. Stk.	96—88	..	5 2 3
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord.	105—108	..	4 12 7
1,513,280	Stk.	Feb. 25	5⅛	Commercial 4 p.c. Stk.	106—108	..	4 16 4
560,000	,,	,,	5	Do. 3½ p.c. do.	103—105	..	4 15 3
475,000	,,	Dec. 29	3	Do. 3 p.c. Deb. Stk.	81—83	..	3 12 3
800 000	Stk.	Dec. 10	5	Continental Union, Ltd.	98—100	..	5 0 0
200,000	,,	,,	7	Do. 7 p.c. Pref.	138—140	..	5 0 0
492,270	Stk.	—	5½	Derby Con. Stk.	121—123	..	4 9 5
55,000	,,	—	4	Do. Deb. Stk.	104—105	..	3 16 2
148,995	,,	Apl. 1	5	East Hull 5 p.c. Ord.	96—98*	..	5 2 0
486,090	10	Jan. 27	12	European, Ltd.	24½—25	+½	4 16 0
354,060	10	,,	12	Do. £7 10s. paid.	18½—19	..	4 14 9
16,198,670	Stk.	Feb. 10	4⅜	Gas	103¾—104½	+⅛	4 9 3
2,600,000	,,	,,	3½	light	88—90	..	3 17 9
4,062,235	,,	,,	4	and	104—106	+1	3 15 6
4,531,706	,,	Dec. 29	3	Coke	81—83	+1	3 12 3
258,740	Stk.	Mar. 16	5	Hastings & St. L. 3½ p.c.	93—95	..	5 5 3
82,500	,,	,,	6½	Do. do. 5 p.c.	117—119	..	5 9 3
70,000	10	Sep. 29	11	Hongkong & China, Ltd.	17¼—18	..	6 2 3
131,020	Stk.	Mar. 16	7	Ilford A and C	145—147	..	4 15 3
65,780	,,	,,	5½	Do. B	108—110	..	5 0 0
65,500	,,	Dec. 29	4	Do. 4 p.c. Deb.	100—102	..	3 18 5

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
4,940,000	Stk.	Nov. 11	8	Imperial Continental	181—183	+1	4 7 5
1,235,000	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	94—96	+1	3 12 11
195,242	Stk.	Mar. 16	6	Lea Bridge Ord. 5 p.c.	122—124	+2	4 16 9
561,000	Stk.	Feb. 25	10	Liverpool United A.	222—224	..	4 9 3
718,100	,,	,,	7	Do. B	163½—165½	..	4 4 7
306,083	,,	Dec. 29	4	Do. Deb. Stk.	103—105	..	3 16 2
75,000	5	Nov. 26	6	Malta & Mediterranean.	4½—5	..	6 0 0
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	100—102*	..	4 18 0
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	100—102*	..	4 8 3
541,920	20	Nov. 11	3½	Monte Video, Ltd.	12⅝—13⅜	..	5 5 8
1,775,892	Stk.	Feb. 25	4⅜	Newc'tle & G'tesh'd Con	104—105	..	4 3 4
529,435	Stk.	Dec. 29	3⅜	Do. 3½ p.c. Deb.	91—93	..	3 15 3
55,940	10	Feb. 25	7	North Middlesex 7 p.c.	13½—13⅝	+⅛	5 1 10
300,000	Stk.	Nov. 26	8	Oriental, Ltd.	141—143	+1	5 11 11
60,000	5	Apl. 1	8	Ottoman, Ltd.	6—6¼*	+⅛	6 8 0
31,800	53	Feb. 25	13	Portsea Island A.	134—136	..	5 1 0
60,000	50	,,	13	Do. B.	126—128	..	5 1 7
100,000	50	,,	12	Do. C.	119—121	..	4 19 2
114,800	50	,,	10	Do. D and E.	100—102	..	4 18 0
398,490	5	Oct. 28	7	Primitiva Ord.	7½—8	..	4 7 6
796,980	5	Jan. 27	5	Do. 5 p.c. Pref.	5⅛—5⅜	..	4 8 11
488,900	100	Dec. 1	4	Do. 4 p.c. Deb.	99—101	..	3 19 3
1,000,000	10	Oct. 14	8	River Plate Ord.	—	..	—
312,650	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	99—101	..	3 19 3
250,000	10	Apl. 1	9	San Paulo, Ltd.	15—15⅛*	..	5 16 1
62,500	10	,,	6	Do. 6 p.c. Pref.	11½—12*	..	5 0 0
125,000	50	Jan. 3	5	Do. 5 p.c. Deb.	50½—51½	..	4 17 1
135,000	Stk.	Mch. 16	10	Sheffield A	232—234	..	4 5 5
209,984	,,	,,	10	Do. B	232—234	..	4 5 5
523,500	,,	,,	10	Do. C	232—234	..	4 5 5
70,000	10	Oct. 14	10	South African	12½—12⅝	..	7 16 11
6,429,895	Stk.	Feb. 10	5/9/4	South Met., 4 p.c. Ord.	120—122	..	4 9 7
1,895,445	,,	Jan. 13	3	Do. 3 p.c. Deb.	81—83	..	3 12 3
209,823	Stk.	Mar. 16	8	South Shields Con. Stk.	157—158	..	5 1 3
605,000	Stk.	Feb. 25	5⅜	S'th Suburb'n Ord. 5 p.c.	121—123	..	4 12 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—122	+1	4 2 0
117,058	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	122—124	+1	4 0 8
502,310	Stk.	Nov. 11	5	Southampton Ord.	110—112	..	4 9 3
120,000	Stk.	Feb. 10	6⅞	Tottenham A 5 p.c.	133—135	..	5 1 9
453,940	,,	,,	5⅜	and B 3½ p.c.	112—114	..	4 14 4
149,470	,,	Dec. 29	4	Edmonton 4 p.c. Deb.	59—101	..	3 19 3
182,380	10	Dec. 29	8	Tuscan, Ltd.	9½—9⅝	..	8 4 2
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p.c. max.	112—114	..	4 7 9
255,636	Stk.	Feb. 25	6⅜	Wands- B 3½ p.c.	139—141	..	4 14 0
79,416	,,	Dec. 29	3	worth 3 p.c. Deb. Stk.	74—76	..	3 18 11

Prices marked * are "Ex div."

† Next dividend will be at this rate.

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LARGEST SALE OF ANY OXIDE.

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BALE'S FIRE CEMENT.
PAINT FOR GAS-WORKS.
BALE & CHURCH,
5, CROOKED LANE, LONDON, E.

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with which is amalgamated WM. PEARCE & SONS, LTD.
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MOVEMENTS FOR CLOCKS, PHOTOMETERS AND BAROGRAPHS, WHEELS, PINIONS, AND WORMS.
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BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, WAKEFIELD, AND SUNDERLAND.

GAS OILS.
MEADE-KING, ROBINSON, & CO.
Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

SPENCER'S PATENT HURDLE GRIDS.
THE very best Patent Grids for Holding Oxide Lightly.
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THERMOSTATIC regulation of Air and Gas prevents Flashbacks and Carbonization, and insures highest Candle-Power efficiency.
THOMAS J. LITLE, JUNR., Inventor, Bush Lane House Cannon Street, LONDON.

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SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Specialty of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the *best*. Satisfaction Guaranteed.

CAST-IRON Pipes. Spigot and Socket or Flanged. Special Quality—9 feet or 12 feet Lengths. When buying, Write us.
A. LOWCOCK, Limited, SHREWSBURY.

AMMONIA Waste Liquor Disposal.
Purification Plant.
Results Guaranteed. No Working Costs.
JOHN RADCLIFFE, Chemical Engineer, EAST BARNET.

GAS PLANT for Sale—We can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

ROBERT DEMPSTER & SONS, Ltd.,
Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

BROTHERTON & CO., LIMITED.
Offices: City Chambers, LEEDS.
Correspondence invited.

SLOT Collector and Rental Clerk desires CHANGE. Nine Years' Experience with a 130 Millions Gas Company. Colonies not objected to. Excellent References from previous employers.
Address No. 5219, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

AGENCIES WANTED.

THE Managing-Director of a well-known Firm of Gas Engineers, with head quarters at Sydney (N.S.W.), is visiting London shortly, and will be glad to Negotiate for the REPRESENTATION of only First-Class Firms Connected with Gas Lighting, such as Plant, Automatic Lighting Appliances, Pressure, and Testing Instruments, &c.
Address No. 5217, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a good Gas-Fitter. None but Good, Steady Workmen need Apply.
Apply, stating Age and Wages required, to the MANAGER, Gas-Works, BROMSGROVE.

WANTED, a Working Foreman used to Regenerators, Sulphate Plant, Purifiers, &c. State Wages required, together with Personal References, to W. B. MIMMACK, Manager, Gas-Works, PEMBROKE DOCK.

WANTED, as Working Foreman, a Man with a thorough Knowledge of Carburetted Water-Gas Plant. Make about Four Millions per diem. Age, about 30 Years. Wages to commence, £2 15s. per week.
Apply, by letter only, to No. 5215, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Gas-Works Fitter for a Small Works near London. Must be a good Blacksmith, and able to undertake Repairs on Works and District, and be thoroughly competent to deal with Gas-Engines.
Apply, by letter only, stating Age and Experience, to No. 5218, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENERAL Foreman wanted for a Gas-Works making 150 Millions per Annum, situate on the East Coast of England. Good position for a Capable Man.
Apply, by letter, stating Age, Experience, Wages required, and with *copies* of recent Testimonials, to No. 5216, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CORPORATION OF CALCUTTA.

1. THE Corporation of Calcutta are prepared to receive APPLICATIONS for the Post of SUPERINTENDENT OF PUBLIC LIGHTING of the City of Calcutta.

2. Calcutta has a street mileage of about 270 Miles, and is Lighted by means of about 9000 Incandescent Gas-Lamps; the Gas being supplied by a Public Company, with the exception of a few of the outlying Streets and Roads, where there are no Gas-Mains, which are at present lighted by Oil-Lamps, but the Area lighted by Gas is being extended every Year. It is in contemplation to light some of the principal thoroughfares by means of Electric Lamps.

3. Candidates must have Experience of the Management and Control of Lighting Departments in some other City or Town, and must be capable of advising the Corporation as regards the formation of a Municipal Lighting Department and also regarding the selection of Burners, Mantles, &c. Candidates must also be experienced in Photometric Work, and the Corporation has a thoroughly up-to-date and well-equipped Photometric Laboratory. Candidates must be capable of accurately Testing Pressures in, and outside of, the Laboratory, and of determining the discharging capacity of Burner Nipples, as this will be the measure of the amount of Gas to be paid for in the lighting contract about to be entered into. The Corporation have proper and efficient Apparatus for doing this. Candidates should not exceed 45 Years of Age and should furnish a Certificate of Age and also a Certificate of Physical Fitness. The appointment will be for Five Years, with option of renewal, and the Corporation will pay First-Class Passage from England to Calcutta. The appointment will be terminable on Three Months' notice by either side. In case the Corporation gives the notice, a First-Class Passage to England will be provided if required for that purpose. In the event of the selected Candidate giving notice during the currency of his Agreement, he will be required to refund the amount of his First-Class Passage.

4. One Month's leave on full pay may be granted every Year, and longer leave out of India at intervals. The pay of the Post is Rs. 500 per Month, rising to Rs. 750 per month by equal annual increments; but the Corporation are prepared to give the maximum pay of the post—*viz.*, Rs. 750 per month—to a well-qualified and otherwise specially suitable Candidate. The exchange value of the Rupee may be taken as equivalent to One Shilling and Four pence.

6. Applications, stating Experience, Age, and Qualifications, and accompanied by *Copies* of Testimonials, should be addressed to the Secretary, Calcutta Corporation (*not by name*), Calcutta, India, and should reach him on or before the 3rd of May, 1910.

P. N. MOOKERJEE,
Secretary to the Corporation.

Municipal Office,
March 3, 1910.

BOROUGH OF NELSON.

GAS ENGINEER AND MANAGER.

APPLICATIONS are invited for the above post.
Salary, £400 per Annum.
Applications, stating Age, present Appointment and Experience, and enclosing *copies* of Three recent Testimonials, must be sent to me, endorsed "Gas Engineer," not later than Thursday, April 21, inst.
Canvassing directly or indirectly will be a disqualification.

J. H. BALDWICK,
Town Clerk.

Town Hall, Nelson,
April 7, 1910.

GASHOLDERS—Splendid 45 feet dia-meter and New STEEL TANK, fixed Complete to Plan and Specification; also 14 feet and 16 feet Diameter GASHOLDERS, with STEEL TANKS. Can be seen temporarily erected. Re-erected Cheap for immediate Sale.
FIRTH BLAKELEYS, Thornhill, DEWSBURY.

KILMARNOCK CORPORATION.
(GAS DEPARTMENT.)

THE Gas Department of the above Cor-poration have for DISPOSAL at their Langlands Street Works, Kilmarnock, the following SECOND-HAND PLANT:
RETORT BENCH MOUNTINGS, consisting of Mouthpieces, Ascension, Bridge, and Dip Pipes, Hydraulic Main, Connections, Valves, Bench Binding Frame, &c.; one Kirkham, Hulett, and Chandler Horizontal Rotary WASHER SCRUBBER, One Million Cubic Feet per day capacity, Complete with driving gear; One GAS EXHAUSTER COMPENSATOR; One TRAVELLING LIFTING CRANE for Purifiers; Cylindrical STATION METER, with Bye-Pass Complete; Tangyes STEAM PUMP for Tar; COAL TESTING PLANT, Complete for a Charge of ½ cwt.; Three Tons per day "Gillespie" SULPHATE PLANT, Complete in every respect.
In addition to the above, there is a large assortment of CAST-IRON GAS-PIPE CONNECTIONS 12-inch to 15-inch diameter, as well as an assortment of COAL BOGIES, COKE BARROWS, and GAS-WORKS TOOLS.
Particulars will be supplied on Application.
Offers for any portion of the foregoing Plant will be received up till Tuesday, April 26, 1910.

WM. & CHAS. FAIRWEATHER,
Joint Managers.

Gas Offices, Kilmarnock,
April 2, 1910.

GAS COMMITTEE FOR THE CITY OF LIMERICK.

TO RETORT SETTERS AND OTHERS.

THE Gas Committee are prepared to re-ceive TENDERS for RETORT-SETTING, &c., required by them at their Works, Dock Road, Limerick.
Full Particulars and Form of Tender can be obtained from the Engineer and Manager, Mr. H. Hawkins.
Tenders, endorsed "Retort-Setting, &c.," addressed to the Chairman, Gas Committee, Gas Offices, William Street, Limerick, to be sent in not later than Five p.m. on April 18, 1910.
The Committee do not bind themselves to accept the lowest or any Tender.

By order,
H. HAWKINS,
Engineer and Manager.

Gas-Works, Limerick,
March 22, 1910.

GAS COMMITTEE FOR THE CITY OF LIMERICK.

TENDERS FOR OXIDE, &c.

THE Gas Committee for the City of Limerick invite TENDERS for the Supply of 200 Tons of NEW OXIDE, to be delivered at the Gas-Works, Dock Road, Limerick; also for the purchase of about 250 Tons of SPENT OXIDE, delivered f.o.b. Limerick Docks.
Samples of the New Oxide tendered for must be sent with each Tender with full Particulars.
Tender Forms can be obtained from the Engineer and Manager, Mr. H. Hawkins.
The Committee do not bind themselves to accept the lowest or highest Tender, as the case may be.
Tenders to be sent in not later than Five p.m. on April 18, 1910, addressed to the Chairman, Gas Committee, Gas Offices, Limerick.

By order,
H. HAWKINS,
Engineer and Manager.

Gas-Works, Limerick,
March 22, 1910.

SOWERBY BRIDGE URBAN DISTRICT COUNCIL.

PURIFIERS.

THE Gas Committee invite Tenders for the following WORK, to be done at their Luddenden Foot Gas-Works: Pulling out Two Purifiers, Valve, and Connections, and Supplying and Erecting in their place two "GREEN'S" PURIFIERS, Weck Valve, and Connections complete.
On receipt of £1 1s., which will be returned for *bonâ-fide* Tender, Specification and Form of Tender will be forwarded; and any other Information can be obtained from the Engineer, Mr. A. W. Bissell, Gas-Works, Sowerby Bridge.
The Council do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, endorsed "Purifiers," to be received by the undersigned not later than Twelve o'clock noon on Monday, April 25, 1910.

LEWIS RHODES,
Solicitor and Clerk to the Council.

Commercial Bank Chambers,
Halifax.

THE Denbigh Gas and Water Companies invite TENDERS for the Supply of 1700 to 2000 Tons of GAS COAL, and 90 to 100 Tons of ANTHRACITE PEAS, to be delivered at Denbigh Station (London and North Western Railway), as required.
For further Particulars Apply to the undersigned, to whom Tenders must be sent, endorsed "Tender for Coal," on or before Wednesday, the 20th inst.

W. EWART BROCK,

Gas-Works, Denbigh,
April 7, 1910.

BOROUGH OF DARWEN.

TENDERS FOR GAS SLACK AND NUTS.

THE Gas Committee of the above Cor-poration are prepared to receive TENDERS for the Supply of Rough GAS SLACK and NUTS for One Year, to be delivered at the Gas-Works Siding in Corporation Waggons.
Forms of Tender and all Information as to Quantities may be obtained on Application to Mr. A. H. Smith, Gas Engineer, Darwen.
Sealed Tenders, endorsed "Gas Slack," must be delivered to the undersigned not later than Saturday, the 23rd day of April, 1910.
No Tender necessarily accepted.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, March 23, 1910.

BOROUGH OF DARWEN.

TENDERS FOR TAR.

THE Gas Committee of the above Cor-poration are prepared to receive TENDERS for all the Surplus TAR produced at their Gas-Works for One Year.
Further Particulars and Forms of Tender may be obtained on Application to Mr. A. H. Smith, Gas Engineer, Darwen.
Sealed Tenders, endorsed "Tender for Tar," must be delivered to me, the undersigned, not later than Saturday, the 23rd day of April, 1910.
The highest or any Tender not necessarily accepted.

By order
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, March 23, 1910.

BOROUGH OF DARWEN.

THE Gas Committee of the above Cor-poration are prepared to receive TENDERS for the Supply of the following GOODS for One Year:—
Benzol.
Wrought-Iron Tubes and Fittings.
Cast-Iron Mains and Specials.
Brass Fittings.
Gas Wash Boilers.
Full Particulars and Forms of Tender may be obtained on Application to Mr. A. H. Smith, Gas Engineer, Darwen.
Sealed and Endorsed Tenders must be delivered to me, the undersigned, not later than Saturday, the 23rd day of April, 1910.
The lowest or any Tender not necessarily accepted.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, March 23, 1910.

BRIDGEWATER COLLIERIES COKE-WORKS.
(THE EARL OF ELLESMERE.)

TENDERS are invited for the Crude BENZOL produced at the above Works (estimated at 8000 to 10,000 Gallons per Month) testing 80 per cent. at 120° C., during the next Three, Six, Nine, or Twelve Months, delivered into Contractor's Tanks at the Bridgewater Colliery Siding, Wharton Hall, on the Pendleton and Hindley Branch of the Lancashire and Yorkshire Railway, or at the Brackley Siding on the Little Hulton Mineral Branch of the London and North Western Railway.
Tenders, endorsed "Tender for Crude Benzol," to be addressed to Mr. Thomas M. Brown, Bridgewater Coal Offices, 4, Chapel Walks, Manchester, not later than the 25th inst.
Manchester, April 5, 1910.

ISLE OF THANET GASLIGHT AND COKE COMPANY, MARGATE.

TENDER FOR COAL.

THE Directors of the above Company are prepared to receive TENDERS for the Supply of COAL for One Year from May 1, 1910, for their Works at Margate.
The quantity required is 30,000 Tons (comprising 10,000 Tons of Good Yorkshire Washed Nuts, and 20,000 Tons of Good Durham Unscreened Gas Coal), such Nuts and Coal to be delivered at the Quayside, Margate, in Monthly Quantities according to Schedule.
The Gas Company will unload the Nuts and Coal into their carts, and will also pay the Pier and Harbour Dues of 1s. 3d. per Ton. All other costs and charges must be paid by the Vendor; and it is to be noted that barges can generally be accommodated, or steamers, having a draught of about 10 or 11 ft., at Spring tides only. The Company have their own steam crane at the Quayside, Margate, and can discharge at a Maximum Rate of about 200 Tons per day.
Tender Forms and any further Information required will be supplied on Application to the Company's Engineer and Manager, Mr. J. M. Campbell.
Sealed Tenders, endorsed "Tender for Coal," addressed to the Chairman, are to be sent in not later than the 20th of April, 1910.
The Directors do not bind themselves to accept the lowest or any Tender.

By order,
THOS. C. FULLER, F.C.I.S.,
Secretary.

Offices: Addington Street,
Margate, March 31, 1910.

RHYL URBAN DISTRICT COUNCIL.

TENDERS FOR COAL.

THE Rhyl Urban District Council are prepared to receive TENDERS for the Supply of 5300 Tons of Screened GAS COAL, to be delivered f.o.r. Rhyl during the Twelve Months ending June 30, 1911, in such Quantities and at such times as may be required.

Form of Tender and Particulars of Conditions may be obtained on Application to Mr. Leonard G. Hall, Assoc M.Inst.C.E., Gas Engineer.

Sealed Tenders, endorsed "Tenders for Coal," to be delivered to me, the undersigned, not later than April 27, 1910.

Approved Security will be required.

The Council do not bind themselves to accept the lowest or any Tender.

ARTHUR ROWLANDS,
Clerk to the Council.

Council Offices, Clwyd Street,
Rhyl, April 4, 1910.

THE Llandudno Urban District Council invite TENDERS for the Supply of about 7000 Tons of Best Screened GAS COAL and about 800 Tons of CANNEL.

The Coal must be capable of producing a Minimum of 10,600 Cubic Feet of 17-Candle Power Gas per Ton.

The whole will be required to be delivered in the Council's own waggons between the 1st of July next and the 30th of June, 1911, at the Llandudno Station of the London and North-Western Railway, in such Quantities and at such periods as may be ordered from time to time.

Forms of Tender may be obtained on Application to the undersigned; and only such Tenders as are on the prescribed Form will be considered.

In every case where the Particulars asked for are not given, the Tenders will be thrown out and not considered.

Tenders, endorsed "Gas Coal," &c., must be sent to the undersigned not later than the 30th day of April, 1910.

The Tender of any Person or Firm who, personally or through an agent, Canvasses any of the Officers or Members of the Council will be rejected.

The Council do not bind themselves to accept the lowest or any Tender.

ALFRED CONOLLY,
Clerk to the Council.

Town Hall, Llandudno,
April 4, 1910.

CORPORATION OF CALCUTTA.

THE Corporation of Calcutta invite TENDERS for Three Thousand COPPER LANTERNS suitable for Single Light Inverted Incandescent Gas-Burners.

It is absolutely necessary that the Lanterns should be insect proof; but the means of making them so is left to the discretion of the Manufacturer.

The Lanterns should not be painted, as this will be done locally.

Tenders are to be submitted for shipment c.i.f. direct to Calcutta; payment being made when the Lanterns have been passed and accepted in Calcutta.

Samples of what it is proposed to Supply should be sent with each Tender; but Firms who have already submitted Samples through Messrs. Mansfield and Sons, of Liverpool, need not again submit Samples.

Tenderers must state the time for Delivery from receipt of Order.

Tenders should reach the Corporation, addressed to the Vice-Chairman, Calcutta Corporation, Calcutta, India, not later than the 6th of June, 1910.

P. N. MOOKERJEE,
Secretary to the Corporation.

Municipal Office, Calcutta,
March 23, 1910.

CORPORATION OF CALCUTTA.

THE Corporation of Calcutta invite TENDERS for a total number of 10,000 INCANDESCENT GAS BURNERS, to consume (*a*) 3 Cubic Feet Per Hour, (*b*) 3½ Cubic Feet per Hour, (*c*) 4 Cubic Feet Per Hour, and (*d*) 5 Cubic Feet Per Hour, at 20-10ths pressure. The Burners must have arrangements by which the Nipples can be easily and quickly changed to make the burner suit different pressures; but 20-10ths will be the minimum pressure on which they will be used. The Air Inlet should not be adjustable, as it is found that the Lamp Lighters and Cleaners are apt to interfere with adjustable openings. The quality of the Gas is 14-Candle Power when tested with the No. 2 "Metropolitan" burner; and it is of rather Low Calorific Value.

Tenderers should submit two Samples each of (*a*), (*b*), (*c*), and (*d*); one being of the Inverted Type and the other the Erect Type of Burner, but each must be submitted Complete with all necessary Glass-Ware, &c., and with One Dozen Assorted Nipples suitable for each Burner, together with One Dozen suitable Mantles for each.

Tenderers should state their price per 100 for spare Nipples of any size; the size of each Nipple being stamped legibly on it by a number representing its diameter in $\frac{1}{1000}$'s of an inch. The Samples will all be tested carefully for Consumption and Illuminating Power; and the Order will be given to the Firm supplying the Sample which gives the greatest efficiency per foot of gas consumed.

Tenders are to be submitted for shipment c.i.f. direct to Calcutta; Payment being made after receipt in Calcutta.

Tenderers must state the time they require to deliver the total number of 10,000 Burners from the date of order to proceed with the work. The successful Tenderer will be informed by Cable; and must then proceed to carry out the Contract. Samples, however, should be sent direct to Calcutta.

Tenderers must guarantee that the Burners supplied will be in every way exactly as per Sample.

Sealed Tenders should reach the Corporation, addressed to the Vice-Chairman, Calcutta Corporation, Calcutta, India, not later than the 6th of June, 1910.

P. N. MOOKERJEE,
Secretary to the Corporation.

Municipal Office, Calcutta,
March 23, 1910.

COUNTY BOROUGH OF BLACKPOOL.

THE Gas Committee are prepared to receive TENDERS for the Supply of GAS COAL or COBBLES to May 1, 1911.

Tenders to be endorsed outside, and addressed to the Chairman, by the 24th day of April, 1910.

Forms of Tender may be had from the undersigned.

JOHN CHEW,
Gas Engineer.

Gas Office, Princess Street,
April 7, 1910.

TO SULPHURIC ACID MAKERS.

THE Corporation of Bury invite Tenders for the Supply of about 400 Tons of SULPHURIC ACID for the Manufacture of Sulphate of Ammonia, during a period of One Year from the 1st day of May, 1910.

Forms of Tender and Conditions may be obtained upon Application to Mr. H. Simmonds, Engineer and General Manager, Gas-Works, Bury.

Sealed Tenders to be sent to the Town Clerk, Bury, not later than Saturday, April 16, 1910.

BOROUGH OF COLNE.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Surplus TAR made at their Works during the Twelve Months ending March 31, 1911.

Particulars may be obtained on Application to the undersigned.

Sealed Tenders, endorsed "Tar," must be addressed to the Chairman of the Gas Committee, Gas-Works, Knotts Lane, Colne, Lancashire, and delivered not later than Saturday, the 16th day of April, 1910.

The highest or any Tender not necessarily accepted.

FRED. THORPE,
Engineer and Manager.

Gas-Works, Colne, Lancashire,
March 29, 1910.

LEEDS CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the SUPPLY of about 12,000 Tons of BEST CRAVEN or DERBYSHIRE LIME, required for the Purification of Gas at the Several Gas-Works during the Twelve Months commencing on the 1st of May, 1910; also for the SUPPLY of CAST-IRON PIPES, RETORT CASTINGS, &c.

Specifications and Forms of Tender may be obtained on Application to the undersigned.

Sealed Tenders, suitably endorsed, addressed to the Town Clerk, Town Hall, Leeds, to be delivered not later than Saturday, the 23rd inst.

The Committee do not bind themselves to accept the lowest or any Tender.

R. H. TOWNSLEY,
General Manager.

Gas Offices, East Parade,
Leeds, April 9, 1910.

BOROUGH OF MORECAMBE.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Erection of an OUTER LIFT on one of their GASHOLDERS.

Particulars may be obtained on Application to the undersigned.

Sealed Tenders, endorsed "Gasholder Extension," must be addressed to the Chairman of the Gas Committee, Gas-Works, Morecambe and delivered on or before the 23rd day of April, 1910.

The Gas Committee do not bind themselves to accept the lowest or any Tender.

C. RHODES ARMITAGE,
Engineer and Manager.

Gas-Works, Morecambe,
April 7, 1910.

COUNTY BOROUGH OF WIGAN.

(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Supply of STORES over the Year ending on March 31, 1911, as follows:—

(*a*) Wrought-Iron Tube and Fittings.
(*b*) Brass and Copper Tube and Fittings.
(*c*) Lead Gas Pipe.
(*n*) Cast Mains and Connections.
(*q*) Sulphuric Acid.
(*r*) Surplus Tar.

Forms of Tender may be obtained from the undersigned.

The Committee do not bind themselves to the acceptance of any Tender.

Tenders, sealed and endorsed with the name of the article tendered for, to be delivered to Harold Jevons, Esq., Town Clerk, Wigan, on or before Monday, the 18th of April next ensuing.

A Sample of each Article to be forwarded, addressed to the Gas Engineer.

JOS. TIMMINS, M.Inst.C.E.,
Engineer, &c.

Borough Gas-Works,
March 30, 1910.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

(INCORPORATED BY ACT OF PARLIAMENT.)

NOTICE is Hereby Given, that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Association will be held at the City Terminus Hotel, Cannon Street, London, E.C., on Tuesday, the 3rd day of May next, at 2.30 p.m. precisely, when a Report will be made to the Proprietors; a Dividend declared for the Half Year ended the 31st of December, 1909; and the usual Ordinary Business of such Meeting transacted.

NOTICE IS HEREBY ALSO GIVEN, that the REGISTER OF TRANSFERS OF CAPITAL STOCK WILL BE CLOSED from the 19th inst. to the 3rd prox., both days inclusive.

By order of the Board,
ROBT. W. WILSON,
Secretary.

Offices: 21, Austin Friars,
London, E.C., April 11, 1910.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to MESSRS. A. & W. RICHARDS, at 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTHEND WATER-WORKS COMPANY.

NEW ISSUE OF 1000 NEW ORDINARY FIVE PER CENT. MAXIMUM £10 SHARES.

MESSRS. A. & W. RICHARDS will SELL THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 19, at Two o'clock, in Lots.

Particulars of the AUCTIONEERS, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

ANNFIELD PLAIN AND DISTRICT GAS COMPANY.

ISSUE OF 100 £10 ORDINARY SHARES,
AND
200 £10 FIVE PER CENT. PREFERENCE SHARES.

BY Public Auction, at the Old Store Committee Room, Annfield Plain, on Wednesday, the 13th of April, at Seven o'clock, in Lots of Five Shares.

Intending Purchasers may send Instructions to bid, at Price per Share not less than par, to the SECRETARY, Gas-Works, Annfield Plain, Co. DURHAM.

BRYNMAWR AND BLAINA GAS COMPANY.

(Pursuant to the Company's Special Acts, 1866 to 1894.)

SALE BY TENDER OF £8000 FIVE PER CENT. CUMULATIVE PREFERENCE STOCK.

MINIMUM PRICE, £100 FOR £100 OF STOCK.

THE Company has been Established since 1866, and supplies the large and populous area comprised in the Urban Districts of Brynmawr and Nantyglo and Blaina; and this Additional Capital is required for the Extension of the Company's Works and Plant to enable the Directors to carry on the Increasing Business of the Company. During last Year there were over 100 New Consumers.

Any amount of Stock, being £1 or a multiple thereof, may be tendered for; but no Tender for less than £10 of Stock will be accepted.

This is a unique opportunity for small Investors as well as those with larger means.

Last day for delivering Tenders, Saturday, April 30, 1910.

Particulars and Forms of Tender may be obtained of the Secretary, at the Gas-Works, Blaina, Mon.

By order of the Directors.
(Signed) D. ARTHUR PRICE,
Secretary.

April 2, 1910.

A HANDSOME F'CAP VOLUME GIVING AN ACCOUNT OF THE

GRANTON GAS-WORKS

of the Edinburgh and Leith Corporations' Gas Commissioners,

Their Design, Construction, and Equipment, with Illustrations, Plates, and Details of Costs.

By W. R. HERRING, M.Inst.C.E., &c.

Bound in Cloth, price 16s. net each, free delivery in United Kingdom.

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,

LIMITED,

NEWBATTLE COLLIERIES,

NEWTONGRANGE, MIDLOTHIAN.

Testing Instruments

ALEXANDER WRIGHT & CO., LD.
WESTMINSTER.

MIRFIELD GAS COAL.
UNEQUALLED.
Sperm Value 878·85 lbs. per Ton.

Please apply for Price, Analyses, and Report, to the

MIRFIELD COLLIERY COMPANY,
RAVENSTHORPE, NEAR DEWSBURY.
LONDON: 16, Park Village East, N.W.

MIDLAND ENAMELLING CO.,
Manufacturers of
DIALS (Enamelled)
For Gas, Water, Electric, &c., Meters.
DIALS
For Pressure Scales in One Length up to 4 feet.
DIALS
For Clocks, Barometers, Thermometer Indicators, and for every purpose.
140, Finch Rd., Handsworth, Birmingham.

HEATHCOTE GAS COAL
from the
GRASSMOOR COLLIERIES,
CHESTERFIELD.

Rich in Illuminating Power and Yield of Gas.
Above the Average in Weight and Quality of Coke.
Maintains a High Standard in Residuals.

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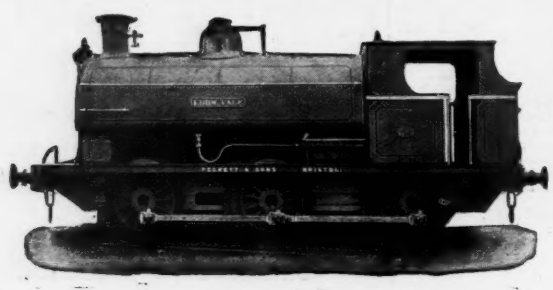

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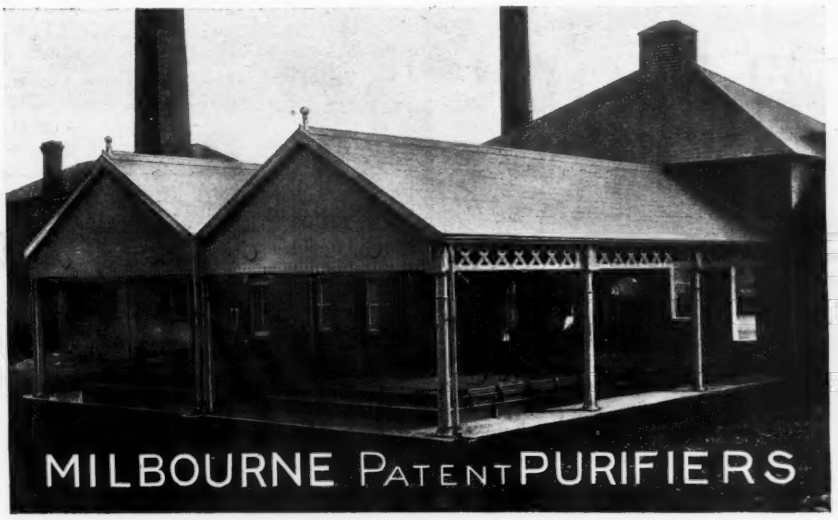

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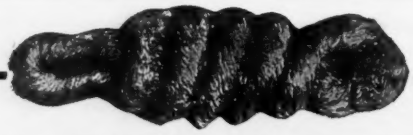

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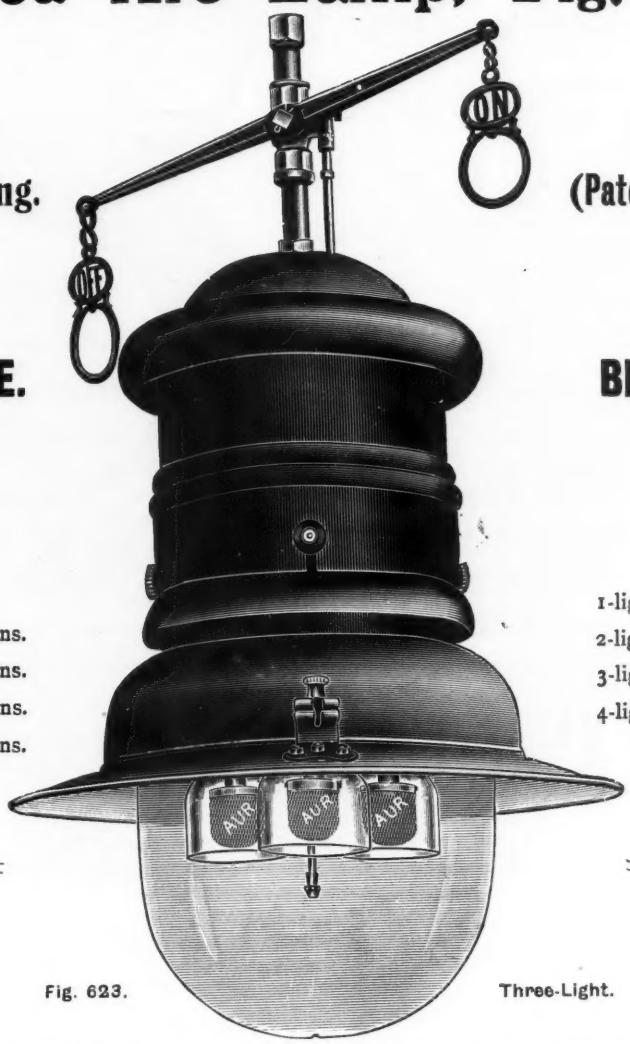

Fig. 623. Three-Light.

Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.

	Gas per hour.	*C.P.*	*Steel.*	*Copper Case.*		*Gas per hour.*	*C.P.*	*Steel.*	*Copper Case.*
1-light	4 feet	125	**30/-**	**5/-** extra.	3-light	12 feet	400	**52/6**	**6/-** extra.
2-light	8 feet	260	**47/6**	**6/-** extra.	4-light	16 feet	550	**72/6**	**9/-** extra.

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

RENEWALS.

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**
" " " In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**
Case contains . .	*80*	*18*	*18*	*12*

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
Parabolic Reflector, extra "	**3/6**	**6/-**	**7/6**	Not made

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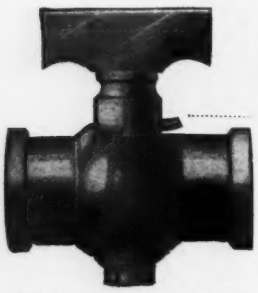

Fig. 1. The Old Style with the Old Trouble.
Note the Pin **A.**

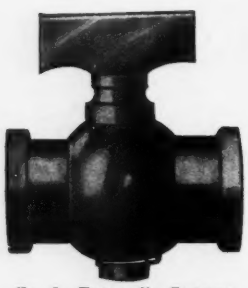

Fig. 2. **Evered's Patent "Safety Stop."** No Pin. No trouble.

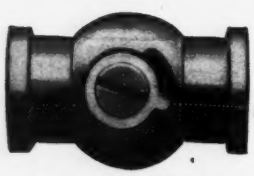

Fig. 3. Underside showing "Safety Stop" in lieu of Pin.

EVERED'S PATENT "SAFETY STOP."

Buyers of Gas Fittings are familiar with the trouble constantly arising through the Stop Pin of the Tap or Cock getting bent or broken, or falling out, thus leaving the Tap without a Stop, and leading to great danger of an escape of Gas.

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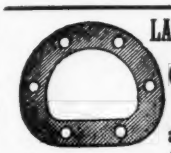

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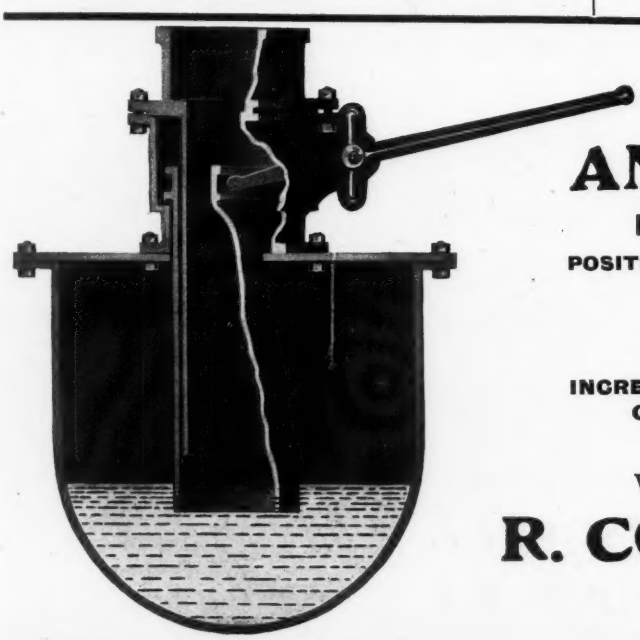

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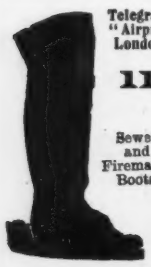

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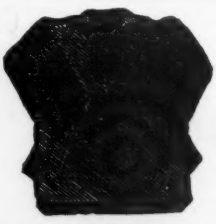

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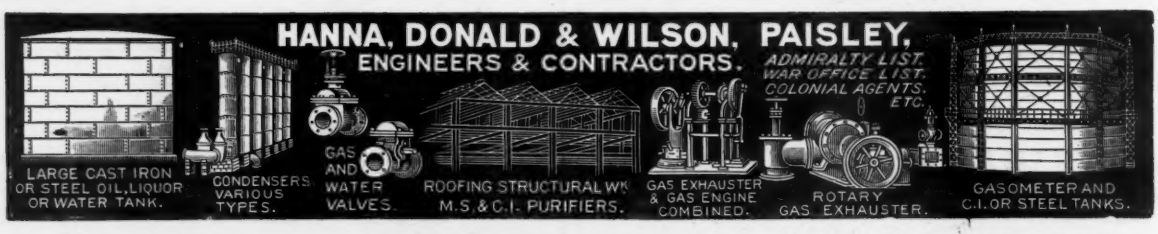
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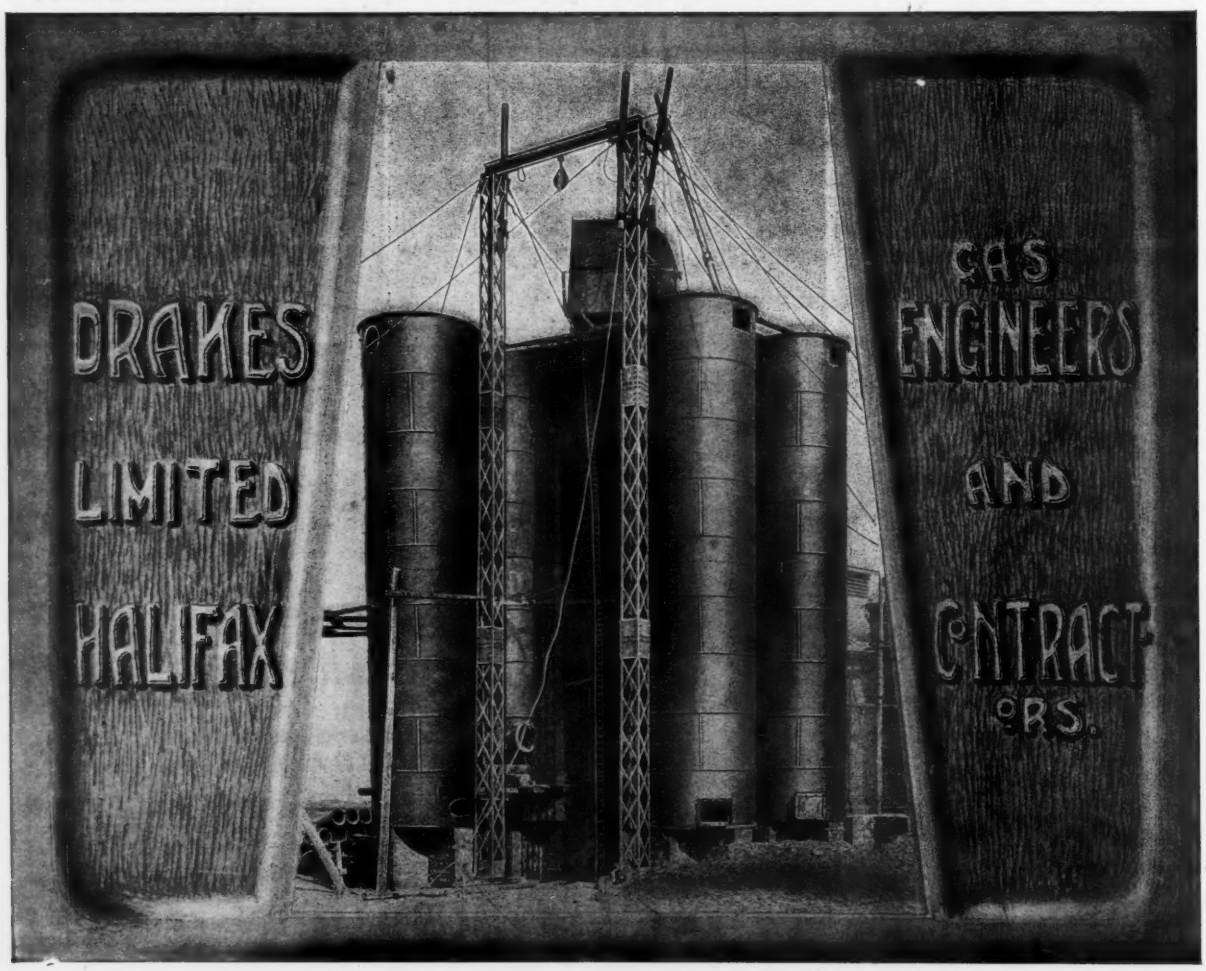

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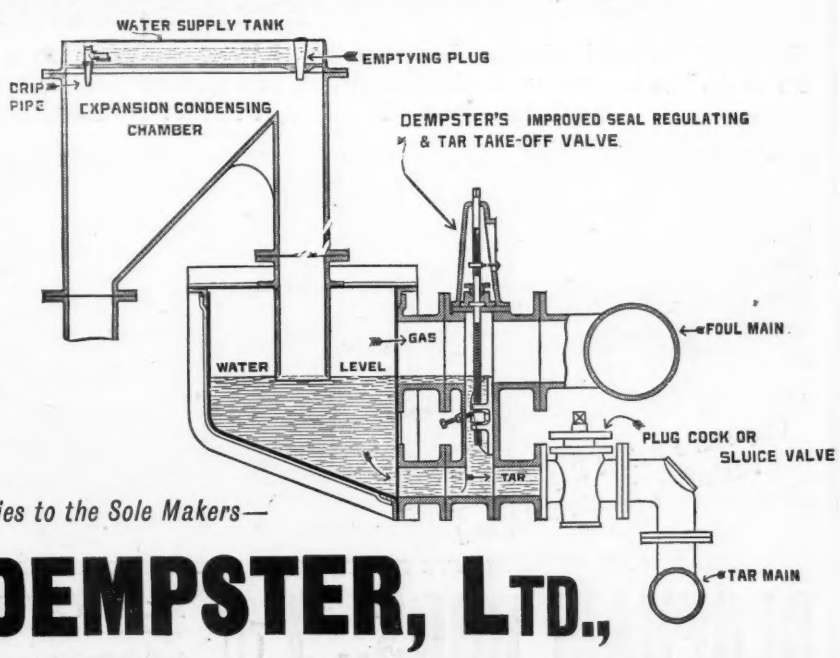

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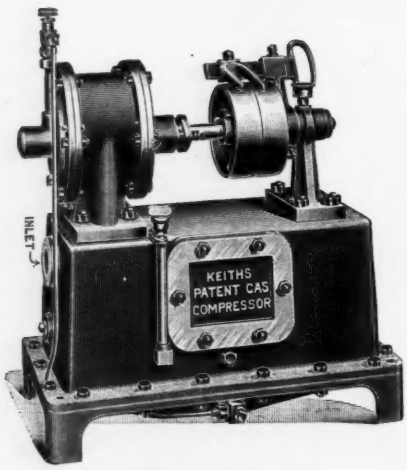

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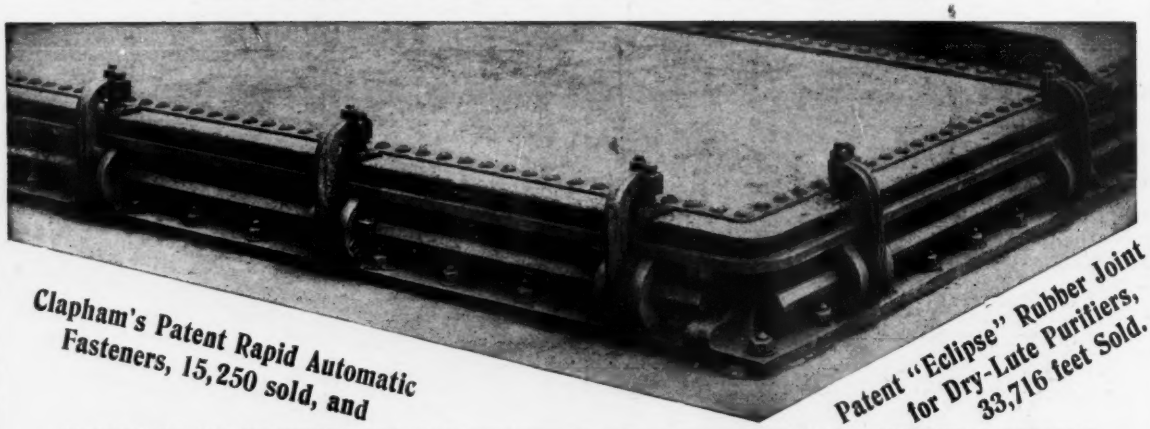

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Printed and Published by WALTER KING, at No. 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, April 12, 1910.